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Los Angeles City Public Schools

MANUAL OF
Cardboard Construction

FOR
THIRD, FOURTH AND FIFTH GRADES
(Third Revised Edition)

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The author is not conscious of indebtedness to any books or authors in arranging the course in this manual, except in that a man may be impressed, in a general way, by what he reads. The illustrations and drawings are just as good as he can make them. The work is not a modification of other systems used elsewhere.

It is hereby dedicated to the children and teachers of the third and fourth grades of Los Angeles City Public Schools.

CHARLES A. KUNOU.

Los Angeles, Cal., March, 1902.

Regarding the folded inserts in the back of this book, and regarding the work in decoration and the drawings illustrating the same, the author has been assisted by Mr. Chas. M. Miller, formerly teacher of Manual training at the State Normal School, Los Angeles, Cal., and hereby acknowledges and ascribes credit to Mr. Miller for his work in this direction.

November, 1906.

Introduction.

This manual, prepared by Mr. Charles A. Kunou, is the outgrowth of practical experience in the school room, and is designed to assist teachers of the third and fourth grades, who have not had special preparation. The aim is to make the work as simple as possible, and to establish a correlation with other subjects, particularly arithmetic and geometry; and to this end the exercises are intended to assist the mental, as well as the moral growth. The progression is methodical, the exercises are simple, and the materials are not expensive. The work is intended to produce useful articles, which are the creative work of the child, instead of merely flat pieces of paper, with names attached. The using of paste is avoided as much as possible, and a system of "flaps" in combining surfaces is employed.

Cardboard construction has a definite educational value, because it stimulates the mental activities of the children. It calls into play mind energies which ordinary school systems do not develop in these grades. It inculcates habits of originality, accuracy, observation and neatness.

These courses prepare and lead to the more extensive work in the higher grades, in that they gradually train in definiteness of form and dimensions. They are planned to cover a period of two years, with two classes in a room, giving forty minutes each week for ten months in the year.

Printed by order of Board of Education.

JAMES A. FOSHAY,
Superintendent.

Mr. Foshay resigned in 1906 and was succeeded by Dr. E. C. Moore, of the University of California.

General Directions.

The following courses have been planned for the Third and Fourth grades. They are consecutive courses to be applied in the B3, A3, B4 and A4 classes, respectively. Although apparently separate, their inner organic connection constitutes them one continuous course.

The sequence ought not to be broken, because the work is built up on its inner elements, i. e., a mere external view of the course does not wholly convey a complete idea of what it contains. In other words, the models are built on exercises graded and arranged according to the nature and difficulty of performance. A distinction is made between a model and the exercises contained or united in the model. A model is one thing; an exercise is another, and a different thing. A model is the unit of expression of the set of exercises united in it. An exercise is a mental and physical effort, as applied in the manipulation of tools and materials. Hence, the course is a systematic unite for the simultaneous mental and manual training of the children.

Paper (cardboard, cover paper, bristolboard, tagboard, etc.) is a convenient medium of expression, because:

- 1st. It encourages and trains in neatness and cleanliness.
- 2nd. It requires and admits the use of few tools in its extensive application.
- 3rd. It engenders artistic sense and taste by reason of its easy application in the production of real and ornamental articles.
- 4th. It is useful.

B3 Course.

The predominant geometric elements or motives are the square and the rectangle. These are studied and elaborated by indirect repetition, i. e., repetition on advanced and varied problems; going step by step from the easy to the difficult, from the simple to the complex, from the known to the unknown. This repetition is not apparent to, nor felt by the pupils, except as they recognize the beneficent influences of the work and each repetition involves new cognitions, new truths and new applications of the original elements. In this course all measurements are limited to the discrimination of inches and half inches.

The tools and materials used in B3 Course are lead pencil, ruler, right angled triangle, scissors, darning needle, linen floss or Columbia zephyr and paper.

For decorative purposes Dennison's Gummed paper stripped in narrow strips is used.

Eyelets and eyelet punch are used to a limited extent.

A3 Course.

This course is based and enlarged upon the geometric motives, the circle and triangles, and as in the proceeding course these constructions are repeated, and applied under new and varied circumstances, each step increasing in difficulty of performance and complexity of nature.

In the A3 Course the same tools and materials are used as in the B3 Course, adding pencil-compasses and paper fasteners. Measurements are inches, half inches and quarter inches.

Eyelets and eyelet punch are used to a limited extent.

B4 Course.

In this course the square and rectangle (oblong) are applied in advanced work, and tools and materials are the same as in the preceding course.

A4 Course.

This course combines in its exercises many of the elements of the preceding courses and involves construction of polygons such as hexagons and octagons. In this course the same tools and materials are used as in the preceding courses, adding paste.

Knives may be used in the latter part of the Fourth Grade, and on supplementary work. No covered work or so-called book binding should be attempted as required class work. Some little surface pasting is done in attaching fancy paper to the outside of some finished models.

All measurements are limited to inches, half inches and quarter inches.

In all work, teachers should observe and gather materials and suggestions for improvements of the course. Such suggestions should be in the line of simplification, concentration and decoration.

What is expected of pupils at the end of each Term.

It is expected that pupils in the B3 class at the end of the term should be able to discriminate, space and draw readily with ruler, inches and halves thereof; to draw, cut and define the motives of squares and oblongs.

Pupils in the A3 Class at the end of the term should be able to draw, cut and define readily the motives of circles and triangles, in addition to their training in the B3 Class.

Pupils in the B and A4 Classes are trained to use the smaller fractions of quarter of inches, and to draw, develop, cut and combine the various objects based upon problems presented in the courses.

Suggestions in Method of Teaching.

General Method.

Always draw the outline ⁵⁹²⁵ common to the entire figure before spacing and drawing details of the inside. Whatever shape or form a figure may have, there is always some geometric motive and some regular outline defining and embodying it, so that where the inner details of a figure depend on the motives or outlines of a circle, a square or a rectangle these latter must be drawn first, proceeding from without, inward.

Reduced to a principle, the method may be stated thus:—Consider the outline, divide into definite spaces to obtain proportions and symmetry.

This method may be called synthetico-analytical method.

How to Teach

1st. Construct and develop accurately and gradually as the instruction is given the whole model on the blackboard, dictating at the beginning every step in the geometric process. Do not expect the pupils to **think out** mathematical constructions. Few **men** can construct a polygon unless shown how.

2nd. Use model, explaining the relation of it to the drawing, and its parts.

3rd. As the work progresses, dictation of specific steps is reduced to general statements. Pupils can copy from chart or blackboard drawing.

There is "dictation and dictation." A military command is one form of dictation. The command is given for a limited and specific movement.

The soldier responds and stands transfixed when the limit implied in the command is reached. This analogy illustrates the pernicious mode of dictation which should not be used in the teaching.

Reverse the process. Suppose the commander to inquire of the soldier when, how, why and why not, and to what extent he should execute the command. The soldier now becomes a reasoner, a thinker, inquirer and executor.

Thus it should be in teaching children. **Dictate** "how"—in the beginning, then reverse and **ask**. The author knows that

the greatest of all teachers taught by parables and then asked.

In teaching in this work let the dictation come "toward you," toward the teacher, and children will soon repel unnecessary assistance.

4th. Always let pupils draw the first line at the top edge of their paper, then, in order to ensure ease and accuracy in the use of the triangles in the production of side lines, and in order to avoid the confusion and motion caused by pupils rising in their desks in the attempt to look over the triangle and see whether it is on the line or not; turn the paper so that the top line becomes the base upon which the figure is built up. Thus the triangle is used standing on the line, so to speak.

5th. In beginning the B3 Course, give a lesson or two involving the use of the triangle and ruler only. For example: On a piece of practice paper draw lines 1" apart and $\frac{1}{2}$ " apart. Space 1" and $\frac{1}{2}$ " and draw lines 1", $1\frac{1}{2}$ ", 2", $2\frac{1}{2}$ ", 3", $3\frac{1}{2}$ ", etc., so that the pupils understand how to discriminate between one inch and one half inch, and how to draw parallel lines. When pupils are thus able to draw lines at given distances, parallel and at right angles, the drawing is performed directly on the cardboard.

In beginning the A3 Course practice with compasses on "practice paper" before applying directly on cardboard.

6th. **Amount of work to be done each lesson.** In manual work all children usually apply themselves faithfully. Do not always "try to finish" the model every lesson or in each lesson. Cut the lesson on the time. Then the amount to be done may be stated to be the amount the children "do do." This will carry the work naturally to its completion in the time allotted. Where pupils have finished the prescribed work, encourage original work.

7th. In all manual school work, the success is assured, or it is made impossible, by the foundations laid through the first lessons. Hold back instead of urging on. Resist the "what is next," the "I want to make the next model." Do not **require** quantity, but **demand** quality, and obtain it by arousing the pupils from within; by evoking the will. This will, to do, to make, is the dawn of intelligence, the first steps of education.

8th. **Regarding the system of lines used in this manual.**

In written language, words are made up of letters. So in Linear drawing the different lines are the letters, the alphabet, by which the drawings are read. In teaching in the third and fourth grades, it is too early to attempt the application of different lines, by the children. The teacher should draw the figure on the blackboard in ordinary "full" lines, and frequently apply "dimension" lines. Lines to be scored should be filled in with colored crayon, red or blue. In this way the blackboard drawing will present sharp contrasts in the lines. Children should draw only ordinary lines, heavy and light. Remember that other advanced forms of manual work and mechanical drawing follow the work of the grades for which this course is designed.

➤ 9th. **Time of lessons.** In the city schools of Los Angeles, Cal., each school room has two classes, A and B. These classes are and may be taken at one time and given a lesson a week of forty-five minutes; or same teacher may teach A and B classes separately, in which case each class receives $22\frac{1}{2}$ minutes.

Any teacher of ordinary ability and experience should take the whole room at one time.

The room work, the movement of the paraphernalia, etc., are then reduced to one-half, thus gaining time and conserving energy.

Cutting.

The pupils should be shown how to use the scissors properly and all should sit upright, using only the hands. Counteract the habit of twisting the mouth, inclining the head, projecting the tongue, etc.

Pasting.

In using paste or glue, pupils should supply themselves with small pieces of clean white cloth or soft paper, to smooth down flaps, wipe the fingers, etc.

Folding.

Pupils should be taught to fold the paper in accordance with an approved method. Use ruler upon the line, and fold upward and toward "you," with ruler as guide and rest. Remove ruler, fold over and smooth down with fingers, then raise the paper to the angle required.

On tagboard or folderboard or other heavy papers, place rule on side opposite to lines and fold so that scored lines come on outside of models.

Scoring.

Scoring is the process of making an impression on the figure lines on the heavier papers, such as bristolboard, tagboard, or pulpboard. It should be done with some instrument not quite so sharp as a knife; for the paper must not be cut.

The back edge of the scissors is, in these courses, the most convenient for pupils. Otherwise a bookbinder's paperfolder is the best tool for hand scoring. Score only such paper whose thickness or folding quality requires scoring. Score **on** the lines and fold the figure **in** on the same side, except when using heavy bristol or pulp boards, tag or folder boards, and where edge binding is required.

Terminology.

In all work use geometric terminology, that is: apply the terms perpendicular, horizontal, vertical, oblique, circumference, radius, diameter, apex, base, etc. Use the (seconds)'' in dimensions on drawings. Do not use the abbreviation "in." for inches. However, do not expect or attempt too much in this direction at the outset. As the pupils' work progresses, and the terms are frequently applied, they become distinct and fully understood by the pupils.

Original and Supplementary Work.

Reading is taught for the purpose of developing children, and so is arithmetic, writing and music. Children are not employed, it is presumed, in these subjects "to see what can be done in these lines." Thus also, cardboard construction should be used as a means of formal education. In giving supplementary work, models whose elements are co-related to other school work, say geometry, should be encouraged. The simple solids, the cube, cone, and pyramid are here conveniently applied—not as ordinary solid forms, but as applied in life objects, such as frames, baskets, etc. In all manual work in the public schools, the utilitarian side is, therefore, subordinated to the intellectual.

System or organized efforts must exist in the schools. Indi-

vidualism is not subverted by systematic efforts on the part of all in the class. The faculties of individuals are developed by doing a definite thing at and in a definite time, and as required. Much of so-called original work combines efforts which are directed always in the channels offering least resistance, and when completed result either in weariness or false self-satisfaction. Original work should be encouraged only where pupils have finished the prescribed work, so that it expresses their highest efforts, making the original work a privilege. In such cases the work should be formed into problems to be solved. That is, the pupil suggests to the teacher "what" he desires to make. Then a drawing is made, and the model worked out as other exercises in the course. X

Fastening and Punching.

In fastening with punch let the punch and eyelets be given to one child in each row respectively.

These children finish their fastening and pass the punches and eyelets to other children. Thus this may be done at any time and be found to be a means of discipline. Those pupils who will not wait orderly and patiently may lose their chance to finish their models.

How to Cut Sandpaper.

Sandpaper must not be cut with scissors in the ordinary way. The small silicon particles will dull the edges of the scissors. Draw the figure required on the back of the sandpaper, that is, on the smooth side. Then, using ruler—on straight lines—slide the scissors along it with the back side of the points in the lines to be cut out. It is not necessary to cut clear through so as to come in contact with the sand. Thus cut, the sandpaper parts or breaks easily.

System of Lines Used in Manual.

Line 1. Ordinary or full line, outline, to be cut.

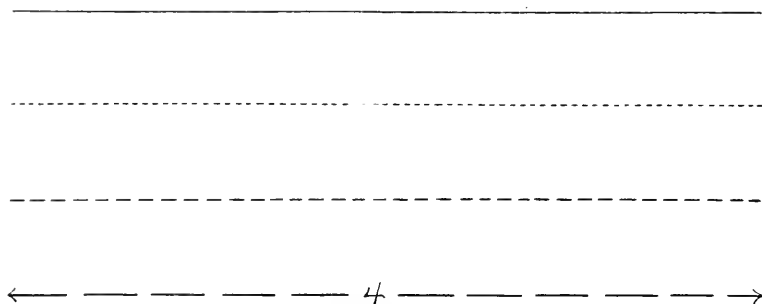
Line 2. Dotted line, construction line, help line; to obtain figure, not to be scored.

Line 3. Dashed line, to be scored, not cut.

Line 4. Dimension line, to indicate size of figures and parts thereof.

Pupils draw no dotted lines.

Pupils should draw their figures in ordinary lines only.



The drawings in this manual were made so that the figures for dimensions were to be read from the bottom and from the right hand side. The arrangement of the cuts compelled a change of position in many instances.

MATERIALS AND TOOLS USED IN THESE COURSES.

Dennison's Paper Fasteners, No. 22, round head.

Eyelets and punch.

Darning needles 3."

Linen floss, or Zephyr Columbia.

Excelsior Pencil Compasses, No. 8999, Keuffel & Esser Co.

Scissors 5".

Triangles 36° 60°—wood.

Ruler, brass-bound, $\frac{1}{8}$ " scale.

Sandpaper, No. 1, for supplementary work only.

Paste, Library Paste, in 2 oz. bottles.

B3 Course

33 Course.

No. 1. Square.

Construction:

With ruler draw AB, 3" long.

Turn paper so that top line becomes base.

With triangle draw lines at right angles with A and B.

Measure BC and AD, 3".

With ruler draw DC parallel to AB.

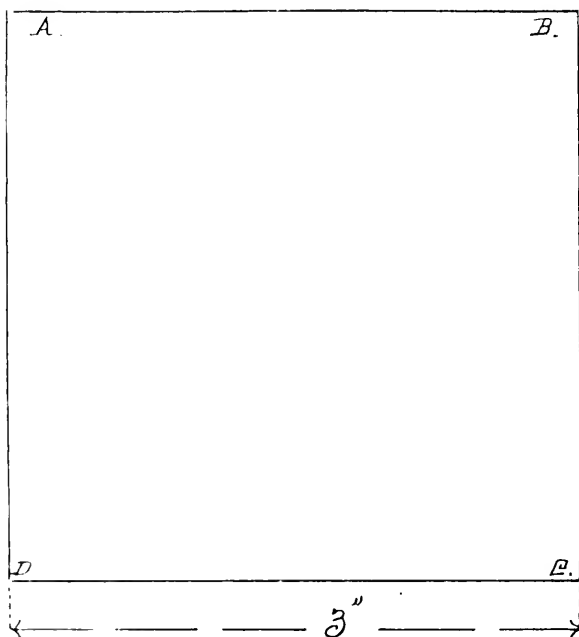
Test the angles with triangle.

Cut with seissors.

Drill carefully the element or concepts of the square.

Material:

Tagboard or bristolboard.



33 Course.

No. 2. Visiting Card. Rectangle.

Construction:

With ruler draw line AB, $3\frac{1}{2}$ ".

With triangle draw lines AD and BC at right angles to A and B.

Measure AD and BC, $1\frac{1}{2}$ ".

With ruler draw DC parallel to AB.

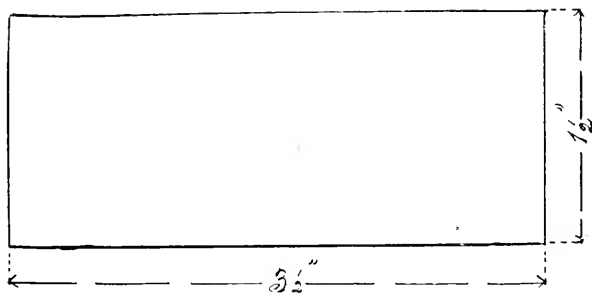
Test angles with triangle.

Cut card with scissors.

Drill concepts of oblong (rectangle) contrasting with square.

Material:

Bristolboard.



33 Course.

No. 3. Windmill.

Construction:

With ruler and triangle draw square 4'' sides.

Draw diagonals. Teach meaning of diagonals.

Measure $\frac{1}{2}$ '' from center on each diagonal.

Cut out square with scissors.

Cut on each diagonal to the $\frac{1}{2}$ '' mark, as in drawing.

Roll right hand corner over and upward, as in sketch.

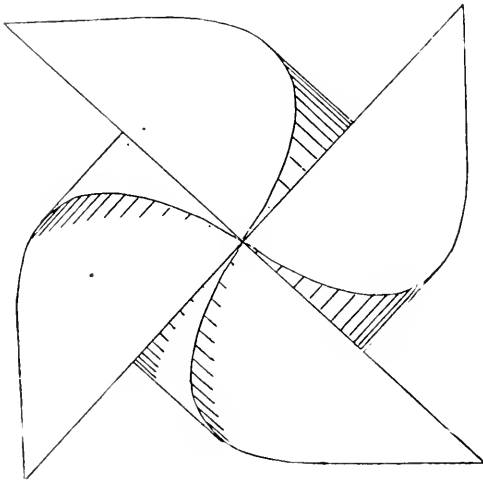
Insert a pin through the ends of wings and center of square, and fasten to end of lead pencil and let pupils spin their mills.

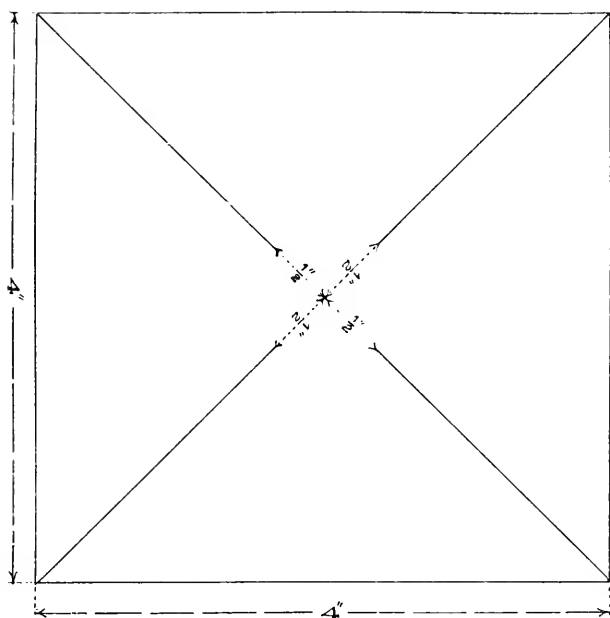
Materials:

Coverpaper and pin.

The windmill is one of the first devices to utilize the wind as a motive power. The earliest attempts were made in the eighth century.

Tell stories of windmills and tell of the wind as a motive power.





X B3 Course.

No. 4. Note-book.

Construction:

Draw a rectangle 5''x3½''.

Draw a line across in the middle.

Cut out figure with seissors.

Fold on middle line.

On white "soft paper" draw rectangle for leaves 4½''x-3½''.

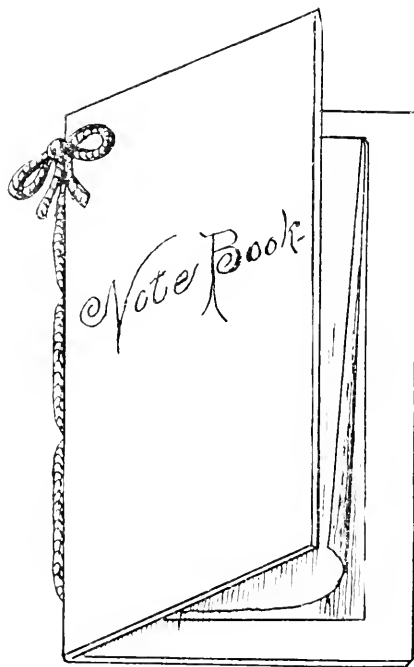
Cut around and fold in middle.

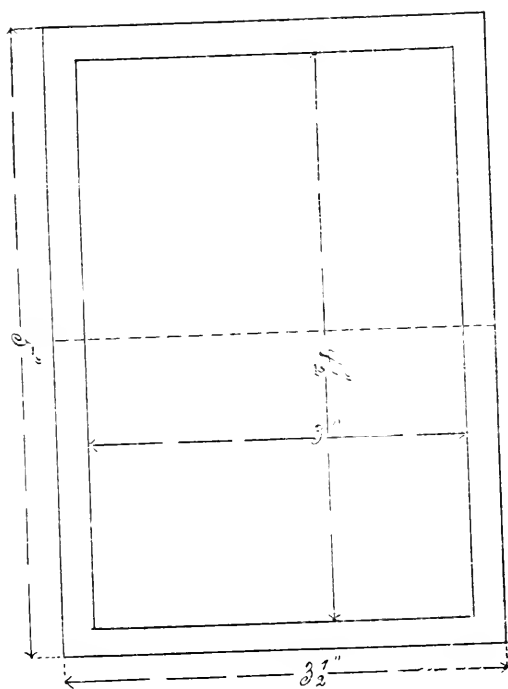
Sew the leaves on to the covers, using floss, taking two or three stitches as may be necessary.

Make larger if desired.

Material:

Coverpaper for covers, common soft paper for leaves.





33 Course.

No. 5. Visiting Card.

(Rhombus.)

Construction:

Draw base line of desired length.

Using the hypotenuse of a 60° triangle (or any angle) draw sides of rhombus equal to base line, measuring with ruler.

Draw top line parallel to base line, using ruler.

Cut out figure with scissors.

Let pupils write their names in the middle of the cards.

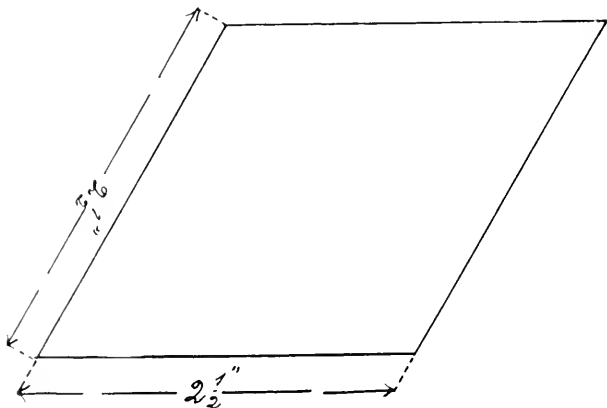
Teach elements of quadrilateral parallelograms—that is, Rhombus has four equal sides, and two opposite angles equal.

Contrast with square.

Material:

Bristolboard.

Teach description of form by fastening four stripes of paper together with pins in the angles thus forming a square. Push on the diagonal angles and the square changes into a Rhombus.



33 Course.

No. 6. Visiting Card.

(Rhomboid.)

Construction:

Draw base line of desired length.

Using the hypotenuse of a 60° triangle, draw sides of rhomboid of desired length, measuring with ruler.

Draw top line with ruler and parallel to base line.

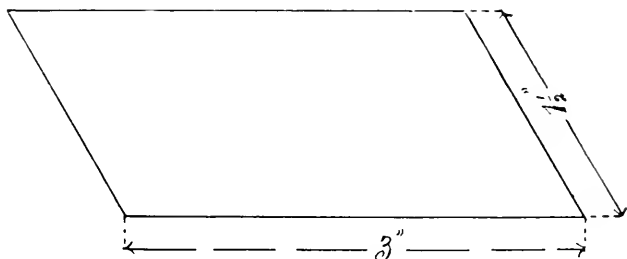
Let pupils write their names in the middle of the cards.

Teach elements of quadrilateral parallelograms, as in preceding lesson. Contrast with rectangle and rhombus.

Teach derivation as in preceding model.

Material:

Bristolboard.



33 Course.

No. 7. Wallpocket.

Construction:

Draw a horizontal line 8" long.

Draw a vertical line (at right angles) 8" long and in the middle of the horizontal line.

Connect the ends of these lines, completing a square, standing on its diagonal.

With triangles draw lines $x, x, 4''$ long at right angles to the horizontal diagonal.

Draw the base line parallel to the horizontal diagonal and through the extremity of the vertical.

Draw flap lines $\frac{1}{2}''$ below base line.

Make ends of flaps oblique as shown in drawing.

Cut around figure on full lines.

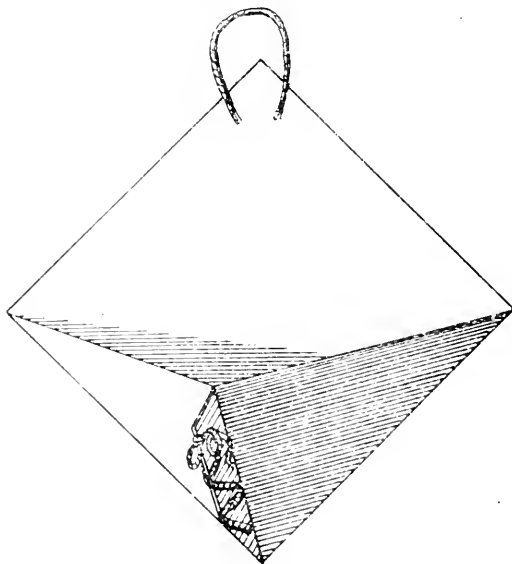
Score and fold on dashed lines.

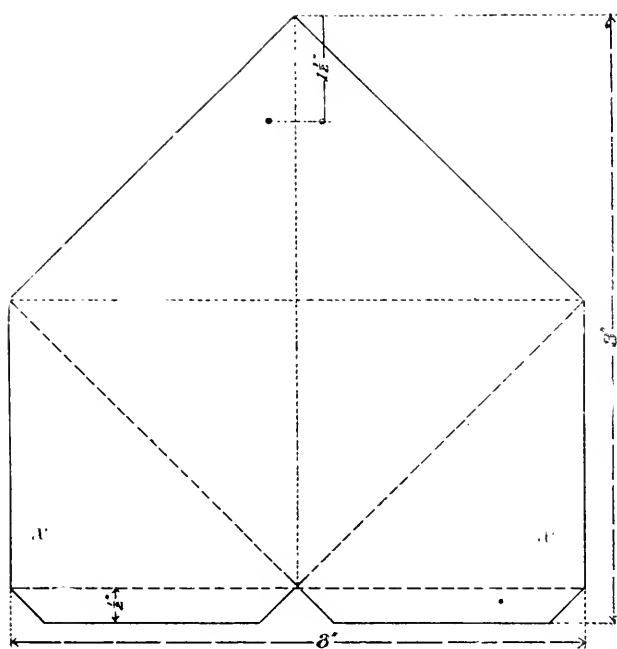
Lace front with floss as shown in sketch.

Put in zephyr to hang model on, as indicated in drawing.

Material:

Tagboard or folderboard.





53 Course.

No. 8. Cardcase.

Construction:

Draw a rectangle $7\frac{1}{2}'' \times 3\frac{1}{2}''$.

Draw lines across $1''$, $1\frac{1}{2}''$ and $2\frac{1}{2}''$ as in drawing.

In the $1''$ space draw the tongue $\frac{1}{2}''$ wide, by measuring $1\frac{1}{2}''$ from each side of rectangle.

Mark off $\frac{1}{2}''$ on the corners of the $1''$ line, and draw oblique lines as shown in drawing.

Cut out figure with scissors.

Locate slot S for the tongue after model is finished by marking with points of pencil on each side of tongue.

Fold model out again, and score between these points until the paper is cut through.

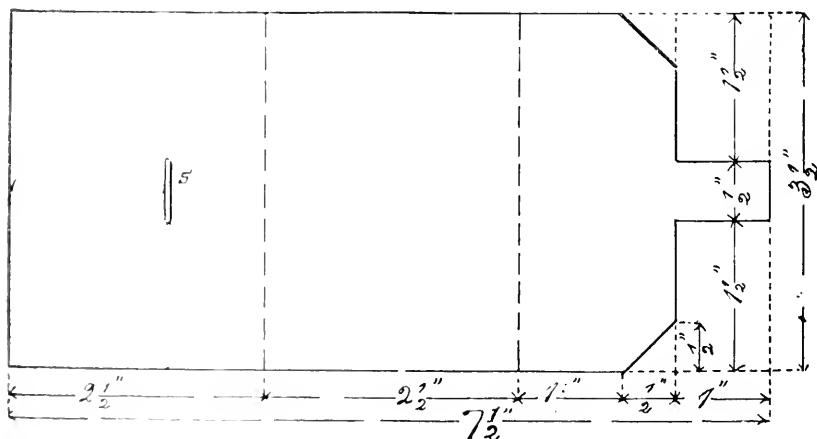
Fold model.

Score and fold on dash lines.

In cutting the slot, bore hole in the ends of the lines with a needle or other pointed instrument, before inserting the scissors.

Material:

Tagboard or coverpaper.



33 Course.

No. 9. Envelope.

Construction:

Draw a rectangle 4"x3".

Find middle points x and with ruler, draw lines along and across the rectangle.

With ruler extend lines A, A, A, A, $\frac{1}{2}$ " outside rectangle Measure 2" on lines X, X, X, X, and connect with points A, A, A, A; and at the ends of rectangle, as shown in drawing.

Cut around figure on the full lines.

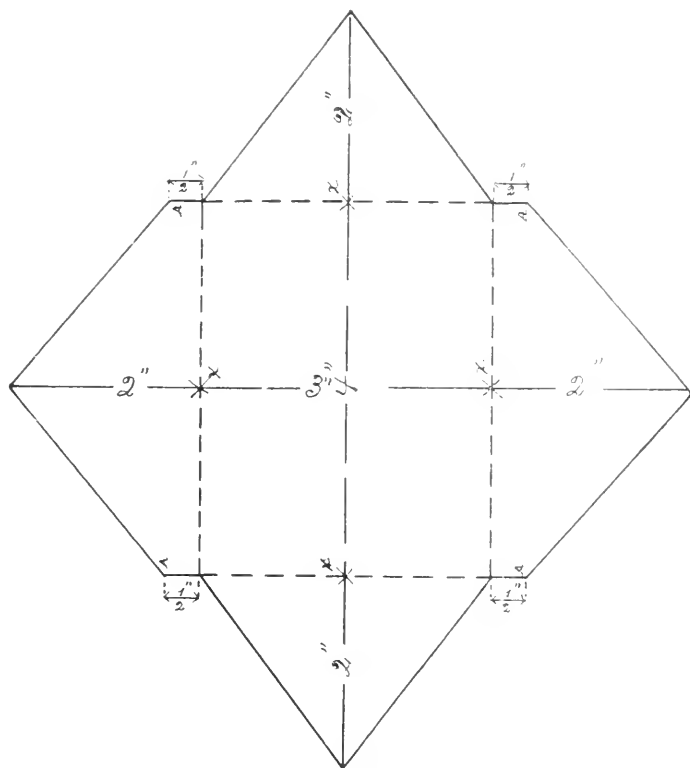
Score on dashed lines and fold in on the lines

No pasting.

Make in larger size and of different construction if desired.

Material:

Cover paper.





A3 Course

33 Course.

No. 1. Bookmark.

Construction:

Using compasses draw circle with $1\frac{1}{2}$ " radius.

Draw diameter.

Measure $\frac{1}{2}$ " on each side of center.

With triangle draw lines AB, and CD, at right angles with the diameter.

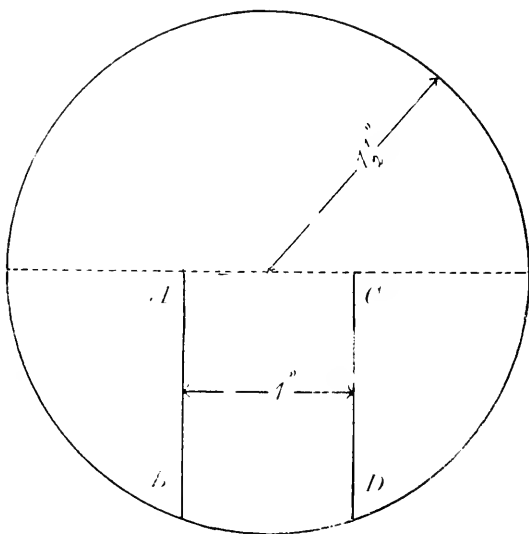
With scissors cut around circumference.

Cut along lines BA, and DC, to diameter.

Drill carefully concepts or elements of circle.

Material:

Bristolboard.



33 Course.

No. 2. Triangular Keytag.

Construction:

With ruler draw line AB, 3'' long.

Using A and B as centers and AB as radius with compasses draw arcs to intersect above AB at C.

With ruler draw lines AC and BC.

Cut triangle with scissors.

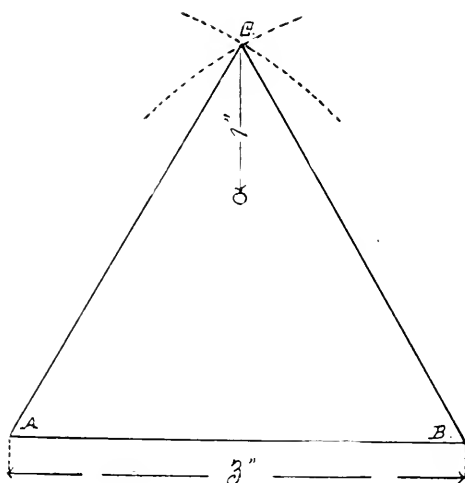
Measure 1'' down from apex of triangle.

Punch hole with punch, and press in eyelets.

Attach thread or floss.

Material:

Tagboard.



13 Course.

No. 3. Thread-winder.

Construction:

With compasses draw circle $1\frac{1}{2}$ " radius.

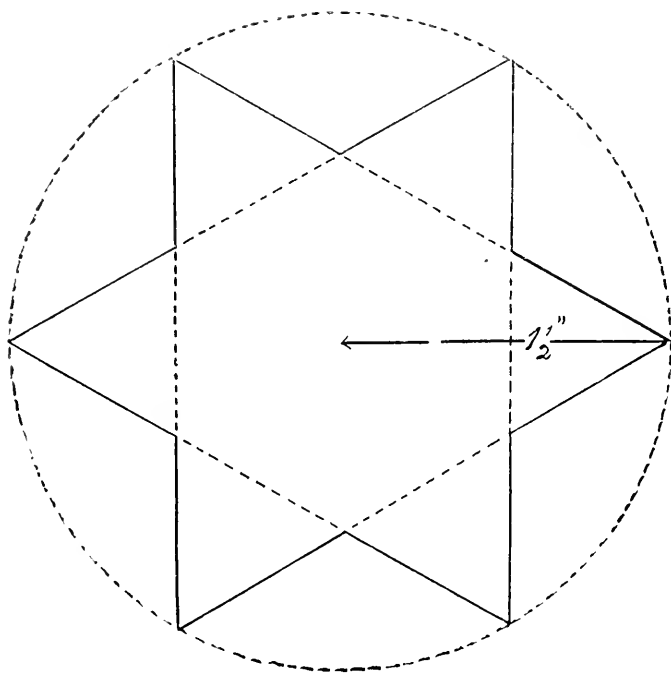
Divide circumference into six equal parts. Radius "goes around circumference 6 times."

Connect points, thus obtaining two equilateral triangles inscribed in a circle.

Cut out figure with seissors.

Material:

Tagboard or folderboard.



33 Course.

No. 4. Penwiper.

Construction:

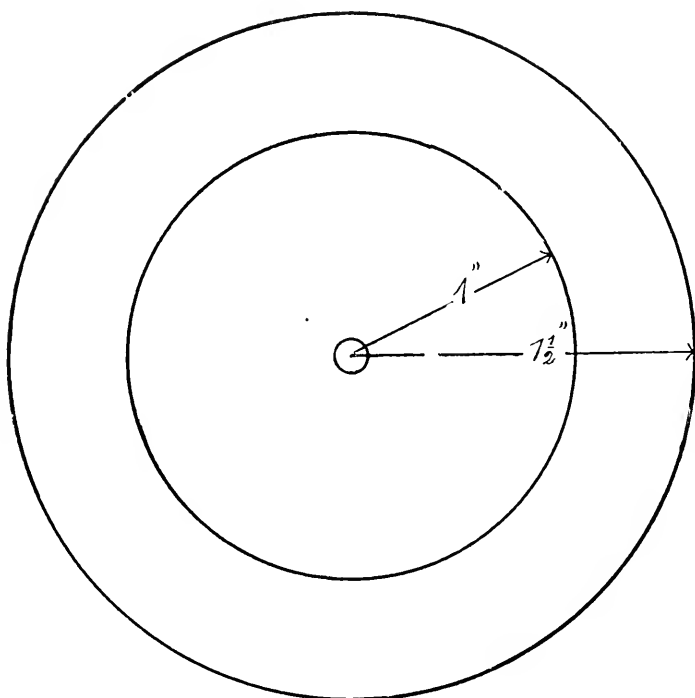
On bristolboard draw circle 3'' diameter.

On blotting paper—of different colors, if possible—draw three circles 3'' diameter. On bristolboard draw a circle 2'' diameter.

Cut out circles with scissors.

Fasten together pieces with one paper fastener inserted in center, placing the large circle of bristolboard at the bottom, the small circle of bristolboard at the top.

Suggest that pupils **may** cut pieces of cloth or chamois skin of same size, at home, thus furnishing themselves with penwipers.



33 Course.

No. 5. Easel.

(Isosceles triangle.)

Draw base line $3\frac{1}{2}$ " long.

With compasses draw arcs 1 and 2,— $4\frac{1}{4}$ " radius.

Draw sides of triangle.

Measure 1" from base line and draw line XX and place points 3 and 4,— $1\frac{1}{2}$ " from sides of triangle.

Measure $1\frac{1}{2}$ " on base line and connect these points with points 3 and 4.

Draw lines 3 and 4, perpendicular to base, using triangle.

Cut out figure with scissors.

Roll flap A forward and upward, making a "rest" to hold picture on as in sketch.

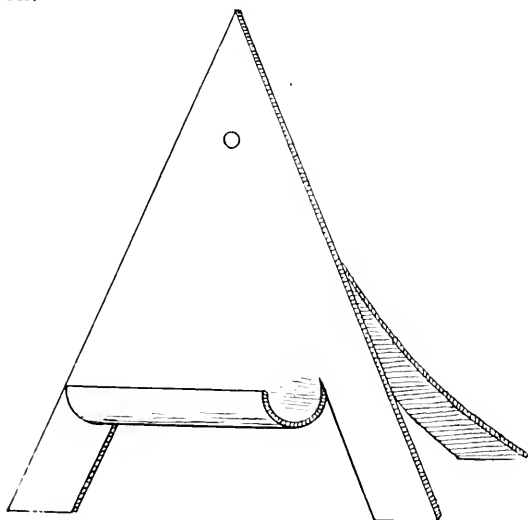
For back supporter, draw and cut a piece of tagboard $4\frac{1}{2}$ "x $1\frac{1}{2}$ " and fasten the same with paper fasteners 1" from apex, as shown in drawing.

Material:

Tagboard.

Make in Larger Size by Another Method.

Draw base line and from middle point draw a perpendicular of required altitude, using triangle. Then draw oblique lines from apex to ends of base line. Then proceed as in first construction.





A3 Course.

No. 6. Circular Picture Frame.

Construction :

On bristolboard draw circle 4'' diameter.

Draw diameters, as in drawing.

Place points 1'' from center on each diameter and draw square as seen in drawing.

Cut around circle, and in diagonals of square.

Roll triangular pieces A, B, C, D, outward as in sketch, using the small end of a penholder.

For back :

On tagboard draw and cut a circle same size as first.

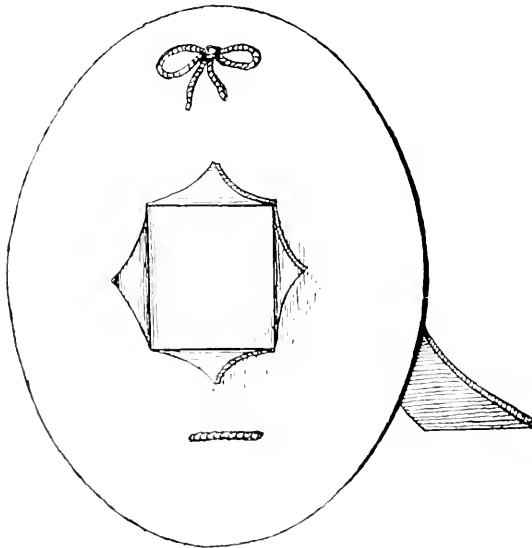
On tagboard draw and cut piece $4\frac{1}{2}'' \times 1''$ for supporter of frame.

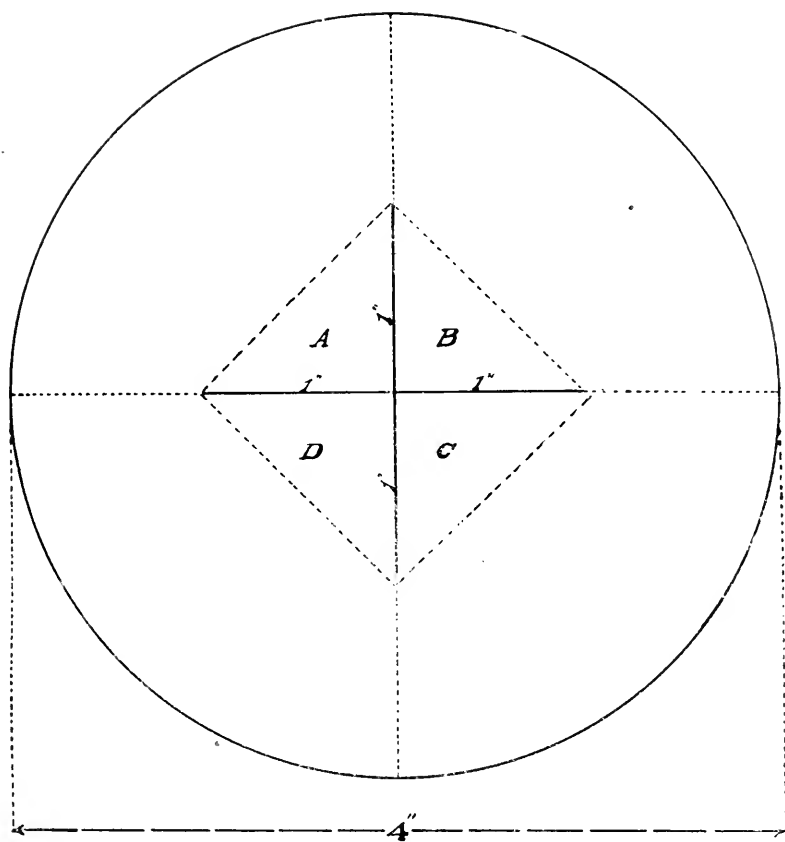
Fasten the three pieces together with floss at the top.

Fasten back and front together at the bottom, as shown in sketch.

Material:

Bristolboard and tagboard.





33 Course.

No. 7. Calendar Mount.

(Quartrefoil.)

Construction:

Draw a square $2\frac{1}{2}$ " sides.

From the middle of the sides draw semicircles 1" radius.

Cut out figure with seissors.

Punch hole and press in eyelet as shown in drawing.

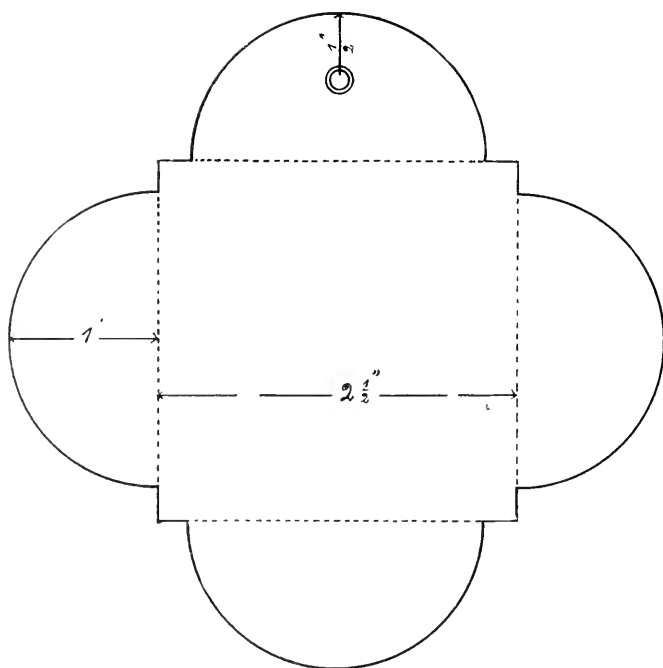
Insert a piece of floss to hang the mount on.

Children may be told to procure a small calendar, which can be obtained for from 2 to 5 cents in any bookstore.

Fasten this on to the mount with floss, paste or paper fastener.

Material:

Bristolboard.



A3 Course.

No. 8. Wallpocket.

Construction:

Draw line A, B, 3'', and on it with compasses construct equilateral triangles, above and below.

On the sides of triangle C construct triangles D, E.

At middle points of sides, draw perpendiculars $\frac{1}{2}$ '', and draw slanting lines, as in drawing.

Draw flap lines $\frac{1}{2}$ '' below triangles.

Score and fold on dashed lines as in drawing.

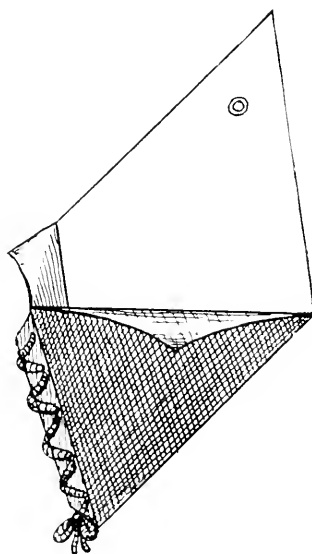
Punch hole and press in eyelet, 1'' from apex.

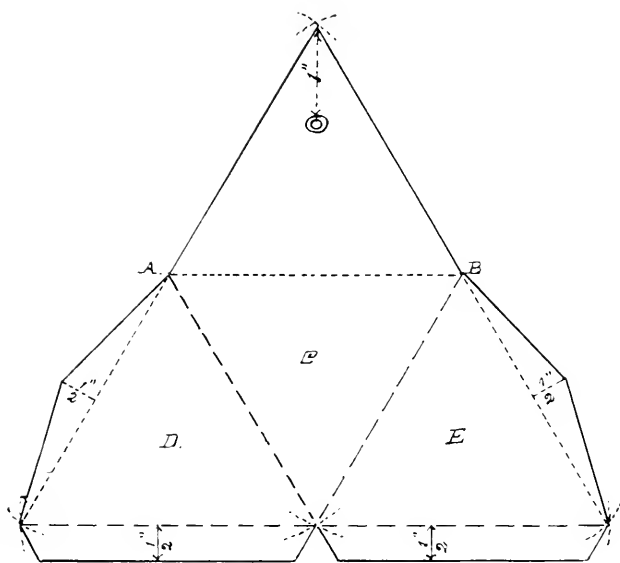
Lace front with floss as in sketch, and bend triangular top pieces outward as shown in sketch.

Enlarge if desired.

Material:

Tagboard or coverpaper.





33 Course.

No. 9. Toothpickholder.

Construction:

Draw a line 2'' long and on it construct an equilateral triangle, apex down.

On sides of triangle draw squares.

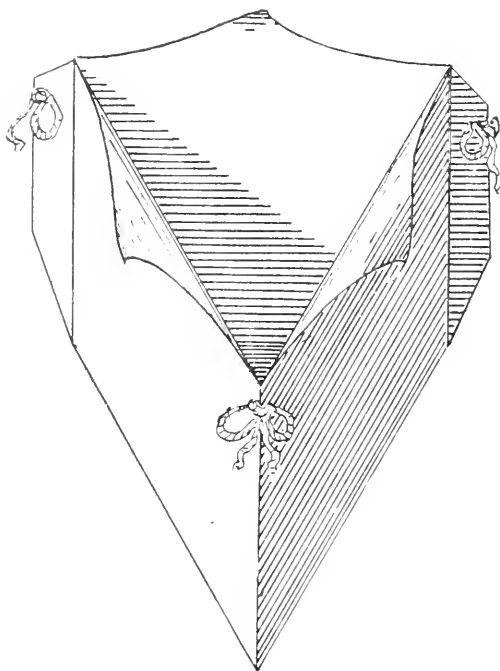
Draw lines $\frac{1}{2}$ '' from top side, find middle and draw pointed pieces as in drawing. Add flap lines $\frac{1}{4}$ '' from outside of squares.

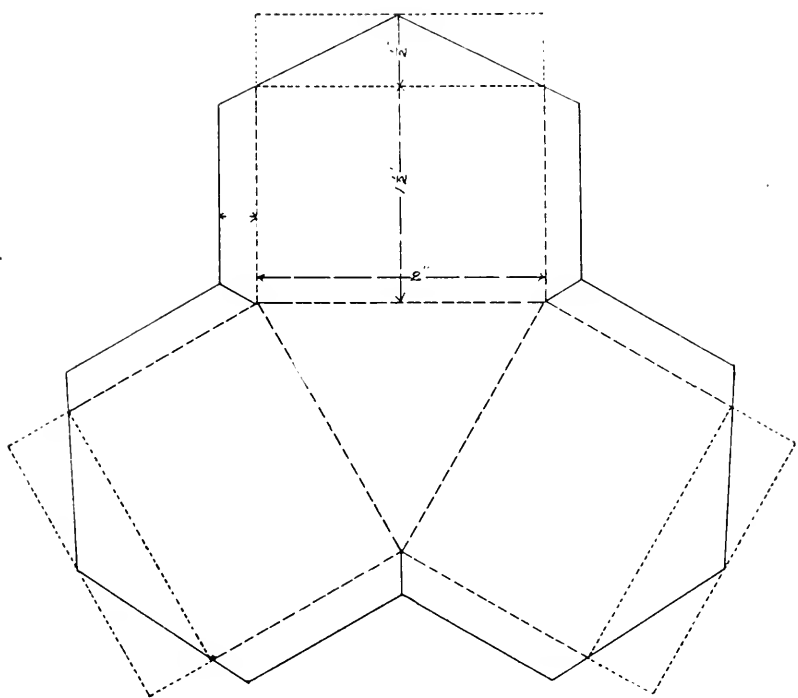
Cut on full lines. Score and fold on dashed lines. Fold flaps outward and fasten with floss, as shown in sketch.

Roll pointed pieces over pencil outward, as shown in sketch.

Material:

Coverpaper.





B4 Course

B4 Course.

No. 1. Open Box.

Construction:

Draw a rectangle 7''x5''.

Draw lines 1'' inside and parallel to sides of rectangle.

Draw $\frac{1}{4}$ '' flap lines in the corner squares.

Produce the diagonal of corner squares and the same will cut flap lines obliquely as shown in drawing.

Cut around figure on the full lines.

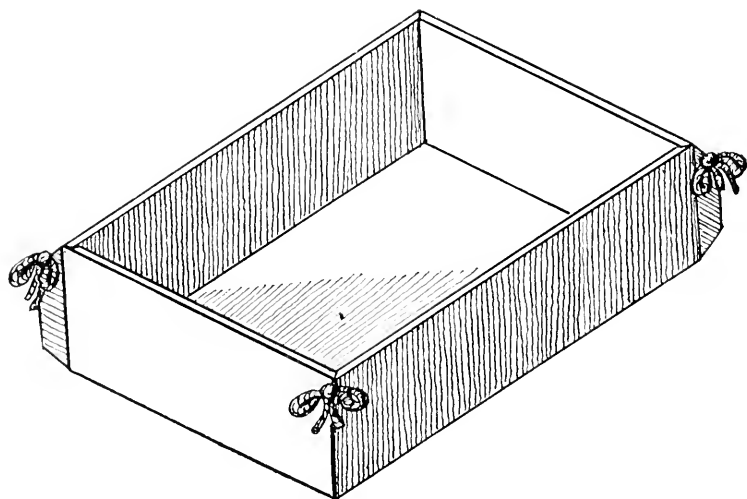
Score on dashed lines.

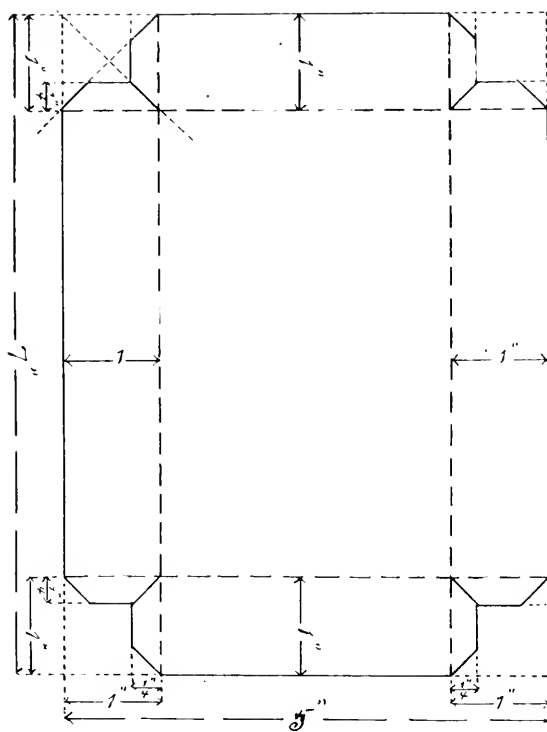
Fold sides of box inward, lines on outside.

Fold flaps outward and fasten corners with floss as shown in sketch.

Material:

Tagboard.





34 Course.

No. 2. Oblong Basket.

Construction:

Draw rectangle $5\frac{1}{2}'' \times 4''$.

Draw lines inside, parallel to and $1''$ from sides of rectangle.

Draw diagonals in corner squares.

From the corners, measure $\frac{1}{2}''$, as in drawing.

Connect these points with oblique lines.

From the same points draw lines to corners of inside rectangle, as shown in the drawing.

In middle of the long sides locate $\frac{1}{2}''$ lines for handle.

Cut around figure on full lines and on diagonals of corner squares.

In cutting the $\frac{1}{2}''$ lines for handle bore a hole in the ends with a darning needle, compass or other pointed instrument, before cutting with scissors.

Score and fold on dashed lines.

For handle draw and cut piece $9'' \times \frac{1}{2}''$, and cut slanting notches $1''$ from each end, as shown in sketch.

Fasten corners of basket with floss. Insert handle from around the outside of basket as shown in sketch.

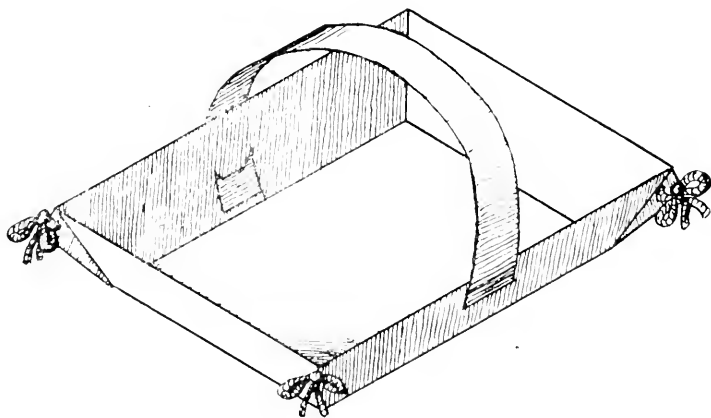
Make as tray or basket.

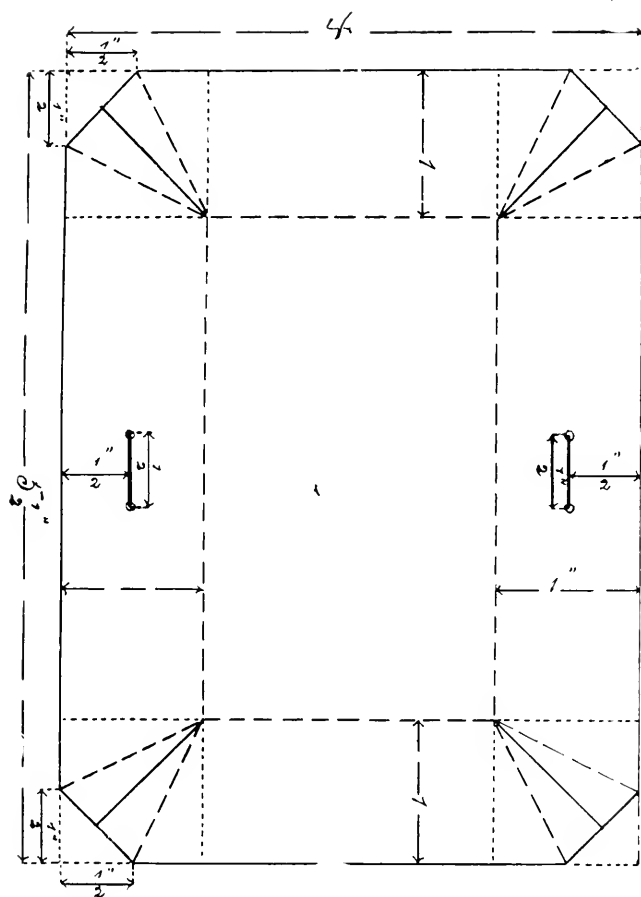
Fasten handle with eyelets.

Fasten corners also, if desired, with eyelets.

Material:

Tag or folderboard.





B4 Course.

No. 3. Square Toothpick Holder.

Construction:

Draw rectangle 6''x2''.

Divide into spaces of $11\frac{1}{2}$ ".

Draw line AB, $\frac{1}{2}$ " from top side, and divide each space into two equal parts.

Draw oblique lines for points.

Add lines for flaps of $\frac{1}{4}$ " at ends of rectangle.

On end line of second division draw square C, and add lines on two sides for standards of A $\frac{1}{2}$ " as in sketch.

Cut with scissors on full lines.

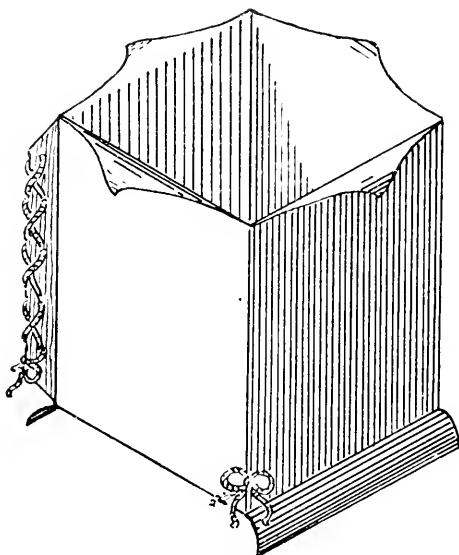
NOTE. Take care not to cut loose the square C. Do not score or fold line AB, but after figure is put together, curve points over, as in sketch.

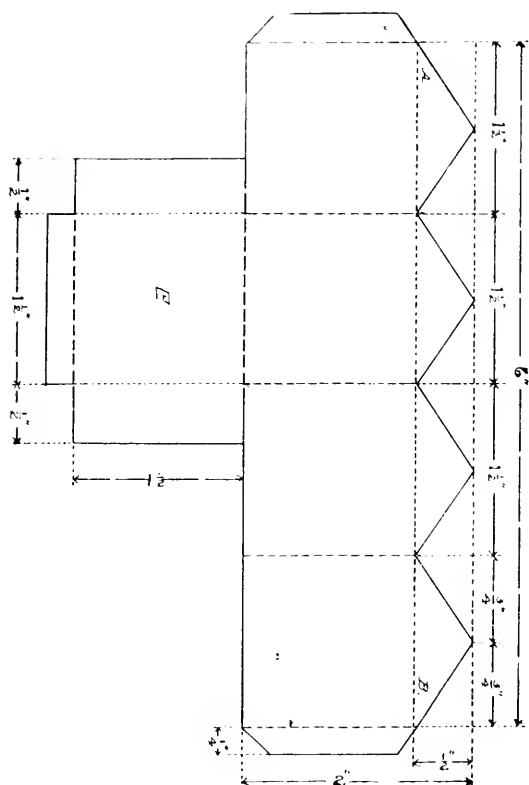
Lace flaps with floss, as shown in sketch.

Curve standards or legs according to drawing, and do not score these lines.

Material:

Tagboard or coverpaper.





B4 Course.

No. 4. Picture Frame.

Construction:

Draw a rectangle 10"x3".

Draw a line across in the middle.

Draw a line across 1" from one end of rectangle.

Draw lines at right angles to each other in middle of one of the divisions of figure as seen in drawing.

Draw a square 2" diagonals on these lines as shown in drawing.

Draw supporter A according to drawing.

Cut around figure and cut on diagonals of the square.

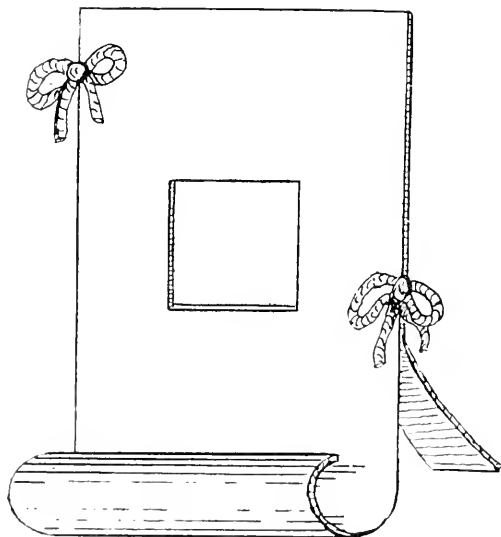
Score on middle line and fold on it.

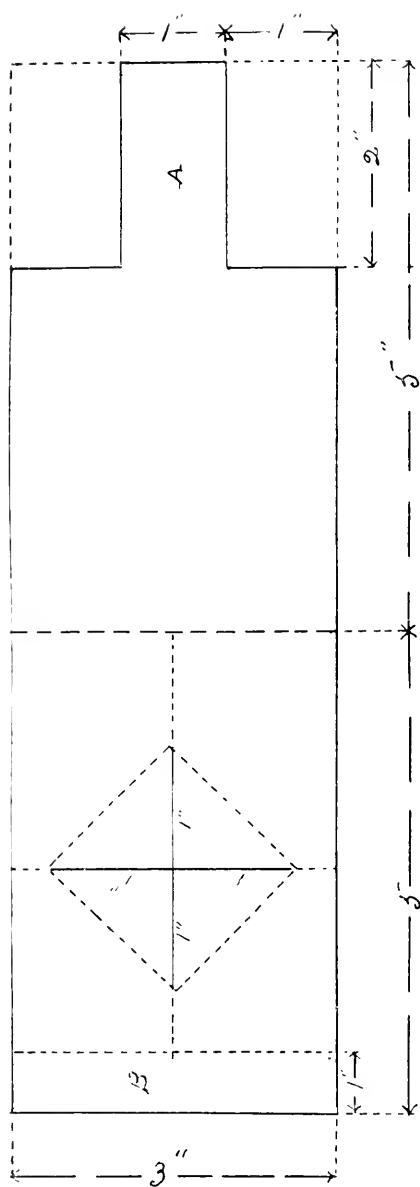
Roll part B forward and upward, as shown in sketch.

Fasten sides of frame with floss or zephyr and bend supporter backward, as shown in sketch.

Material:

Bristolboard or coverpaper.





B4 Course.

No. 5. Covered Box.

Draw rectangle ABCD 10''x3''.

Space and draw lines across at distances indicated in the drawing and extending lines 2, 7 and 3, 6, to form side of rectangle R. R.

Draw flaps 1, 2; 3, 4; 5, 6; 7, 8; each $\frac{1}{4}$ '' from the sides of the rectangles.

Draw the tongue x, $\frac{1}{2}$ '' wide, measuring $1\frac{1}{4}$ '' from each side of rectangle.

Draw slot-line S, $\frac{1}{2}$ '' long and $\frac{1}{2}$ '' from side as shown in drawing.

Cut around figure on full lines.

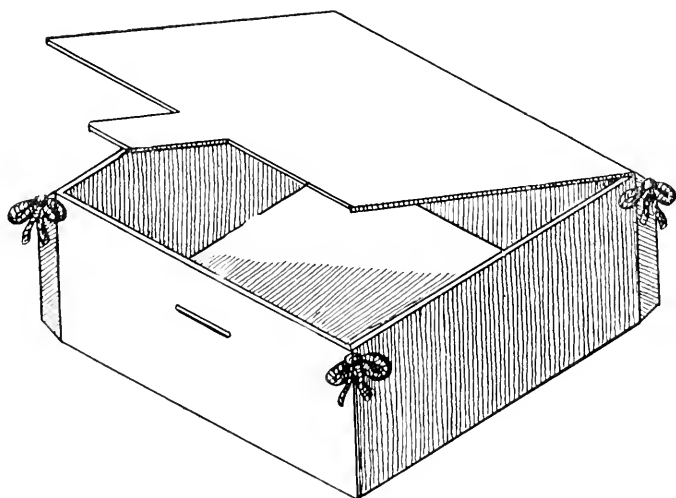
Score and fold on dashed lines, and split open line S, for the tongue

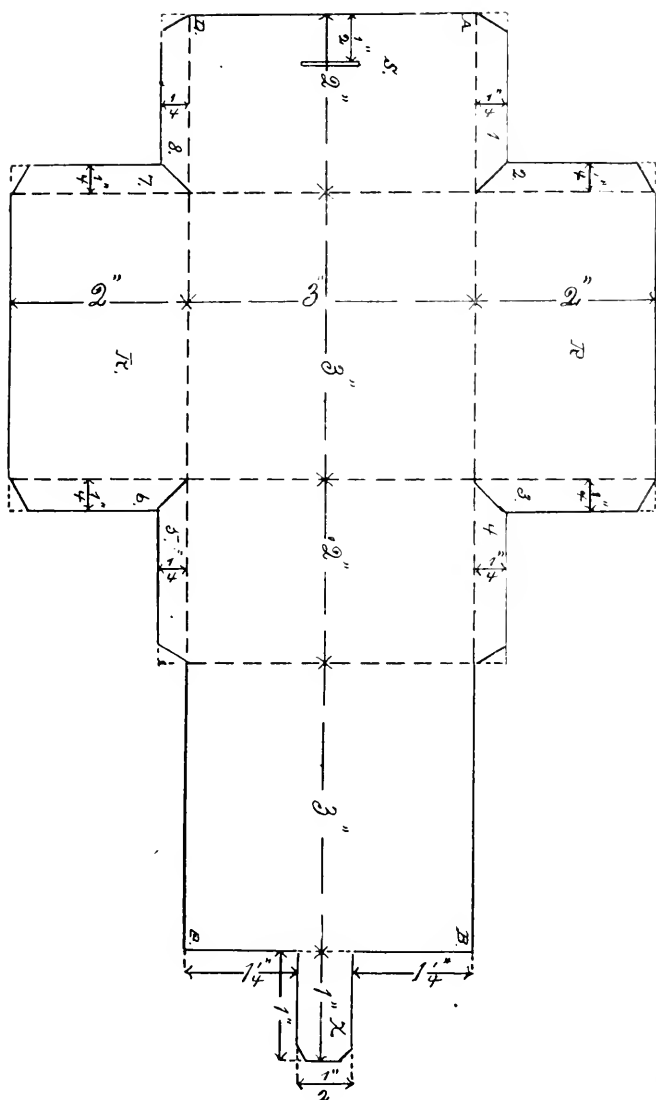
Fold sides of box so that scorings remain on outside.

Fold flaps outward, and fasten corners of box with floss, as shown in sketch.

Material:

Tagboard.





34 Course.

No. 6. Picture Frame.

Construction:

For front piece draw rectangle 4"x5", on bristolboard.

Draw inside rectangle 1" from sides.

Draw diagonals.

Cut around figure and on diagonals.

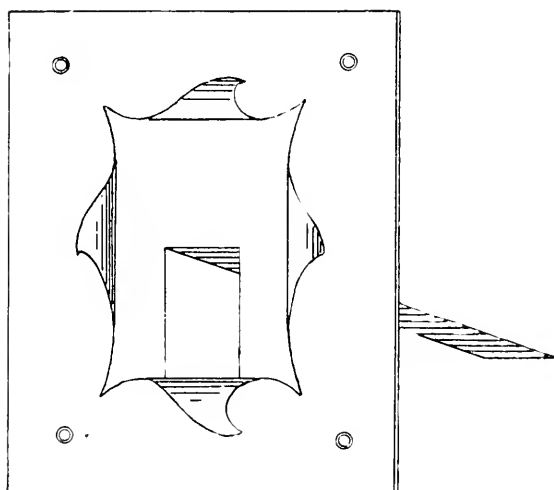
Roll points forward and upward as in sketch.

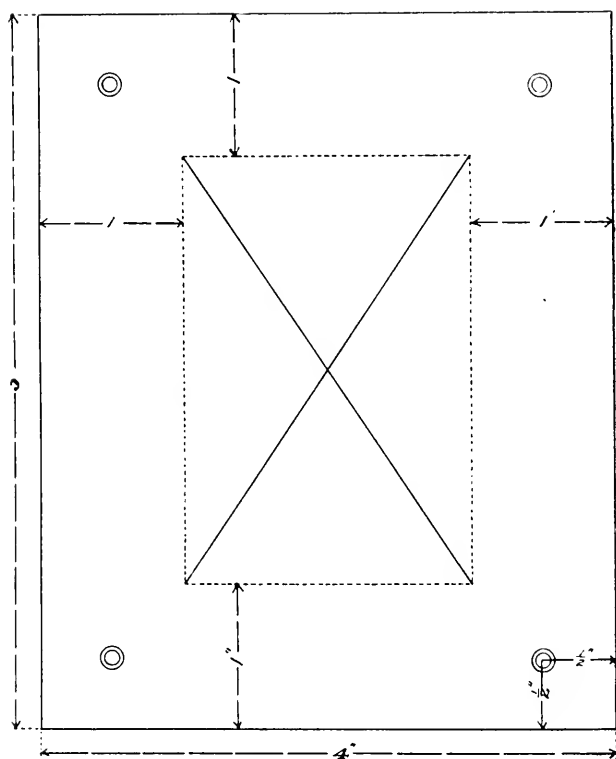
For back piece, make rectangle on tagboard same as front piece.

Draw, cut and bend back support 3"x1" as shown in sketch.

Fasten back piece to the front with eyelets.

No scoring on this model.





34 Course.

No. 7. Basket.

Construction:

Draw a square $7\frac{1}{2}$ " sides.

Draw lines across vertically and horizontally $2\frac{1}{2}$ " apart.

Place points A, 1" from inside lines as shown in drawing.

Connect these points with oblique lines.

On these oblique lines place points $1\frac{1}{2}$ " from points A.

Draw lines to the opposite angles of the corner square.

Locate $\frac{3}{4}$ " lines for handle as in drawing.

Cut out the figure with scissors, following the full lines.

Cut hole for handle with small point of scissors.

Score on dashed lines and fold the paper so that the scored lines come on the outside.

Fold flap pieces outward as shown in sketch.

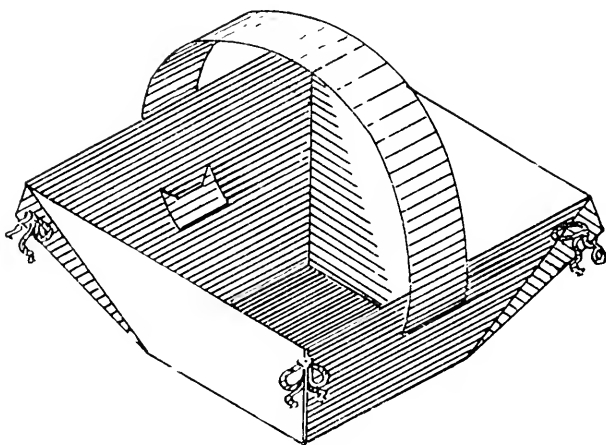
Draw and cut handle $12'' \times \frac{3}{4}''$ and insert as shown in sketch.

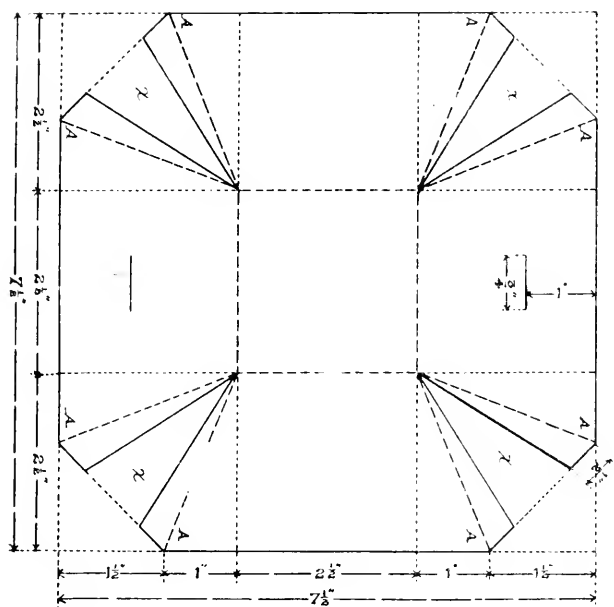
Fasten with floss as in sketch or with eyelet in each corner.

Fasten handle with eyelets.

Material:

Tag or folderboard.





A4 Course

A4 Course. No. 1. Wallpocket.

Construction:

For back of model—

Draw a rectangle 5"x4".

Draw oblique lines in top corners $\frac{1}{2}$ " from the angles as indicated in drawing.

Locate points for eyelets 1" from end and $\frac{1}{2}$ " from top lines of rectangle.

Cut around figure with scissors.

For pocket—

Draw a rectangle 8"x2" and draw lines 2" from ends and across rectangle.

Draw diagonals as shown in drawing.

Add flap lines to diagonals and to base line of the rectangle as shown in drawing.

Cut on full lines.

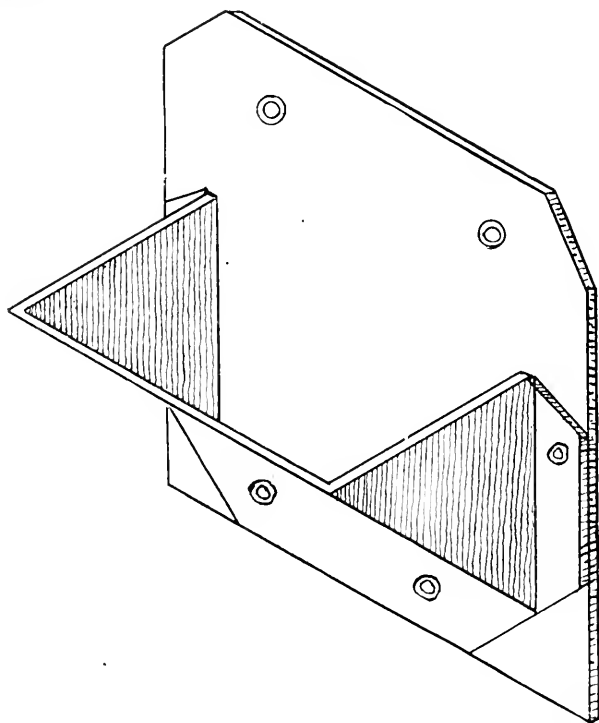
Score on dashed lines.

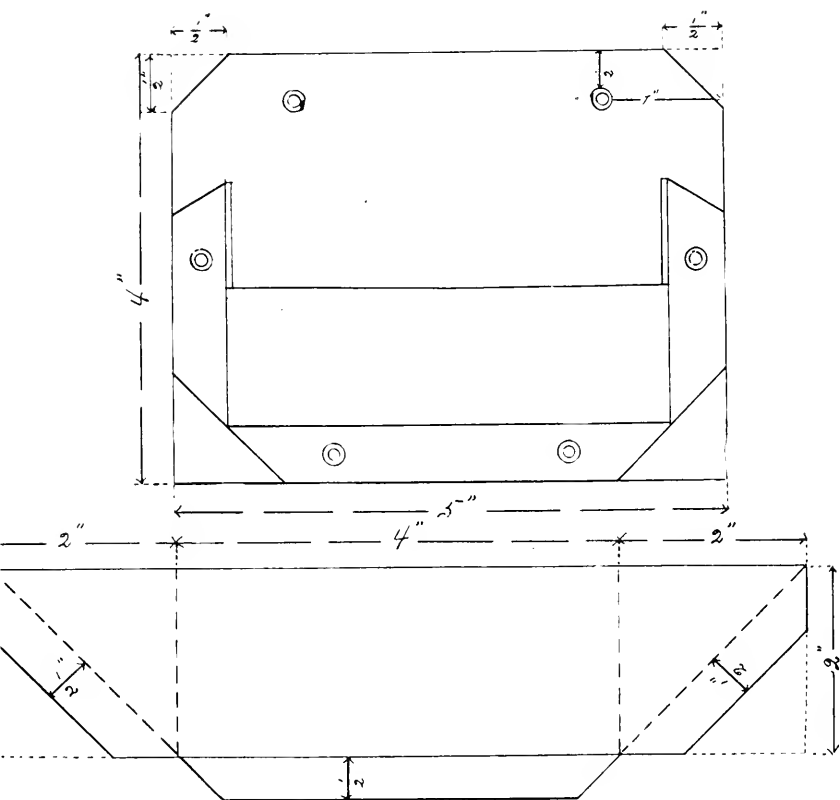
Fold and fasten pocket to back piece using eyelets, as shown in sketch.

Punch holes and press in eyelets in back piece in points previously located.

Material:

Tagboard.





34 Course. No. 2. Matchsafe.

Construction:

For back of safe—

Draw rectangle 4"x5½".

Draw oblique lines in top corners, ½" from angle, as in drawing.

Locate holes in middle of top 1" apart and ½" from top line.

Cut out figure with scissors.

Punch holes and press in eyelets as in sketch.

For box of safe—

Draw rectangle 1"x7".

Draw lines across ½" from each end,

Draw lines AB and CD, 2" from each end of rectangle and extending 2½" as in sketch, then connect B and D.

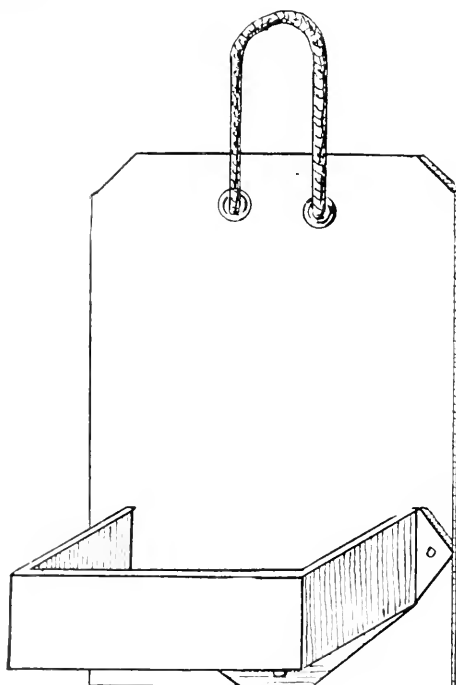
Divide into definite spaces to obtain proportions for bottom and flap of box, according to drawing.

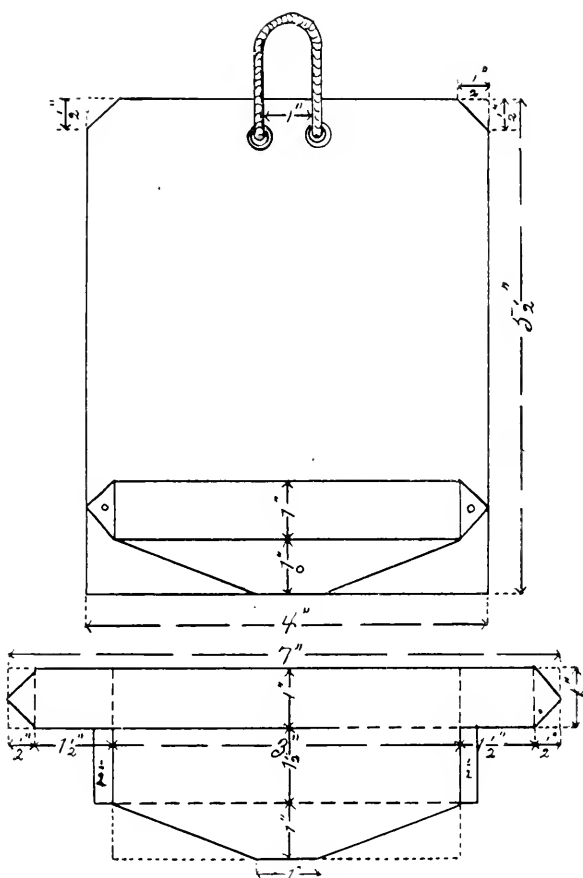
Cut with scissors, score and fold figure.

Fasten box to back with floss, eyelets or fasteners.

Material:

Tagboard.





14 Course.

No. 3. Tray.

Construction:

Draw a square 5'' sides. Draw another square 3'' sides by measuring 1'' from each side of first figure.

Place points $\frac{1}{2}$ '' from each side of outside square and draw oblique lines to angles of inside square, as shown in drawing.

Draw triangles A, B, C, D. $\frac{3}{4}$ '' altitude. Note points of connection.

Cut out figure following the full outline.

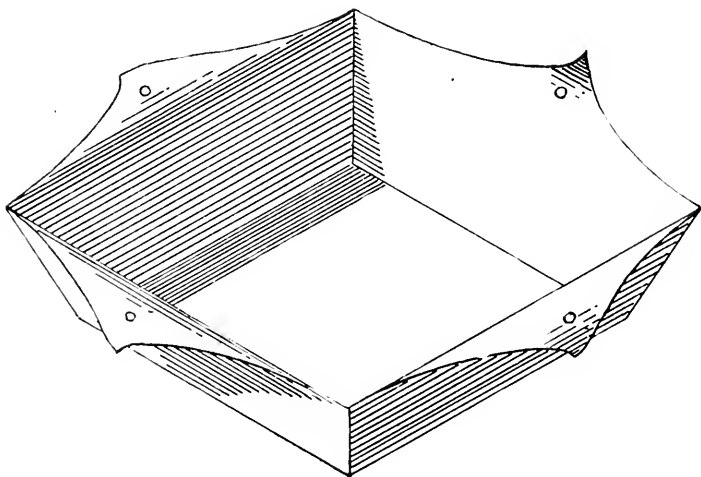
Score on dashed lines in the corners and on the lines of inner square.

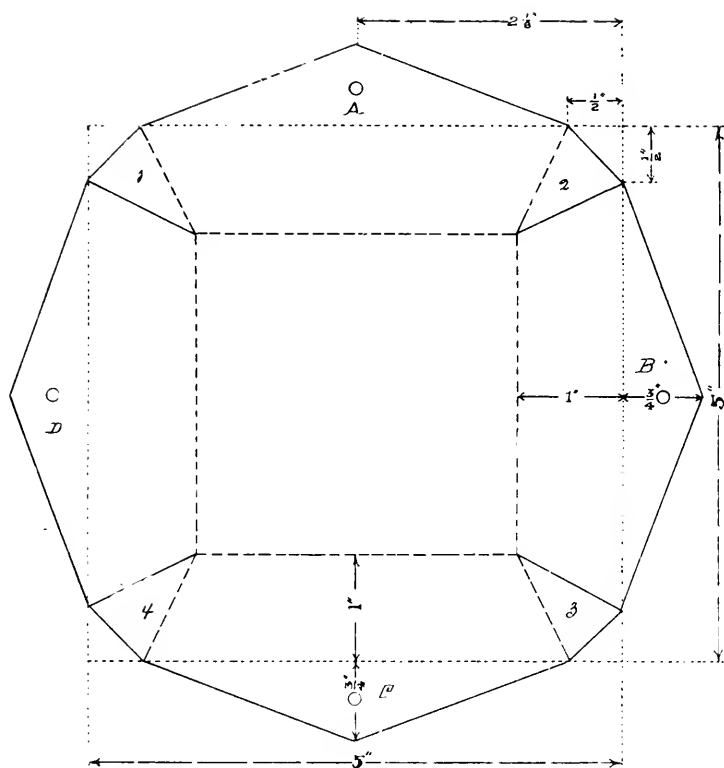
Fold sides upward and apply paste on under side of triangular flaps 1, 2, 3, 4 and fasten same on inside of tray.

Bend triangles A, B, C, D. out and downward as in sketch, Punch holes with punch.

Material:

Tagboard.





A4 Course.

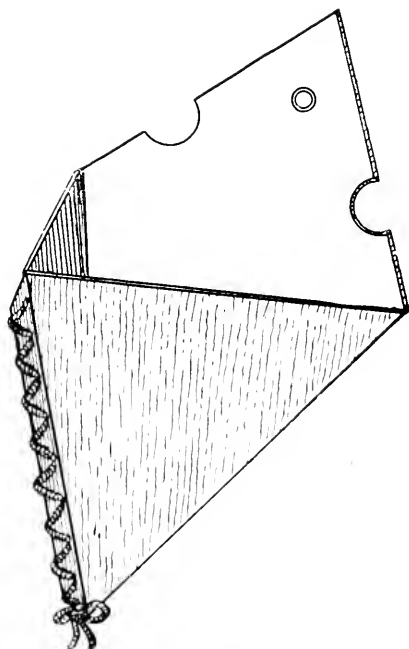
No. 4. Cornucopia.

Construction:

With ruler draw line, AB, 9'' long
With triangle draw line CD, 4'' long and at right angles to
and 3'' from end of line AB.
Connect C and D with B.
With compasses draw arc through C and D with B as
center, and BD or CD as radius.
On the arc set off distance equal to CD.
Draw FB and EB.
Draw AC and AD.
On AC and AD draw semicircles 1 and 2, with $\frac{1}{2}$ '' radius
and 1'' from C and D.
Draw lines 3 and 4 for flaps $\frac{1}{2}$ '' wide.
Cut around figure with scissors on the full lines.
Score on dashed lines.
Fold figure inward on lines.
Fold flaps outward.
Sew flaps in front of pocket ("Linen Floss" or "Columbia
Zephyr") double overcasting or lacing.
Punch hole in top 1'' from apex and press in eyelet with
punch.

Material:

Tagboard.





94 Course.

No. 5. Hexagonal Toothpick Holder.

Construction:

Draw a rectangle 6''x2''.

Divide into six equal spaces, drawing lines across.

Draw line A, $\frac{1}{4}$ '' from top of rectangle, and draw points as shown in drawing.

Draw line B, $\frac{1}{4}$ '' below figure, obtaining flap lines for bottom.

Draw $\frac{1}{4}$ '' flap line at the end.

On the base line of one division in rectangle draw arcs 1 and 2—radius equal to line.

From the center thus obtained and with the same radius draw a circle and on the circumference set off spaces for hexagon.

Cut out figure on full lines. Do not cut off the bottom from the line.

Score and fold on dashed lines.

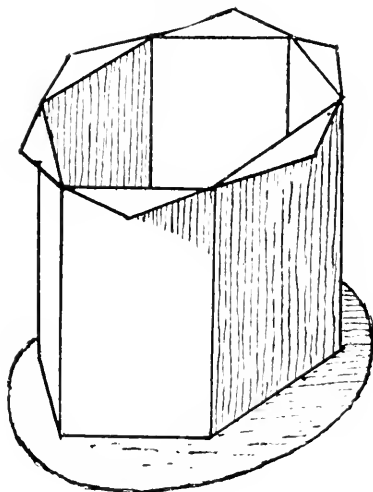
Paste the model with flaps inside.

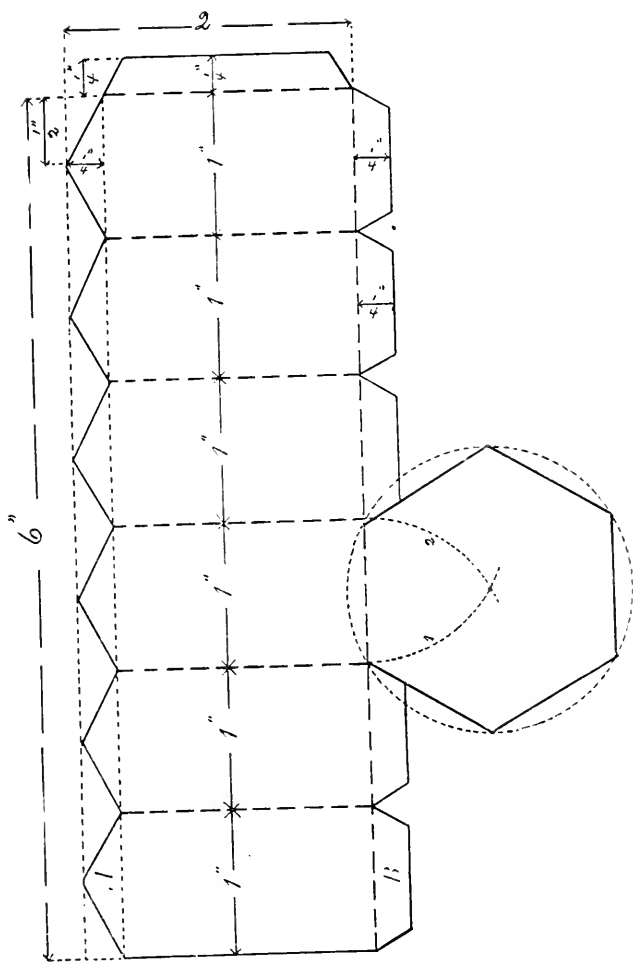
Draw and cut a circular piece and attach for base, as shown in sketch.

Make altitude lower and diameter greater if desired.

Material:

Bristolboard or coverpaper.





A4 Course.

No. 6. Basket.

Construction:

Draw two concentric circles $1\frac{1}{2}''$ and $3''$ radius respectively.

Construct and draw the sides of the hexagon in smaller circle.

Place ruler across two opposite angles, as shown by line AA, to obtain points on circumference of the larger circle, dividing it into six equal parts.

Measure $\frac{1}{4}''$ on each side of these points and draw lines XX, to corresponding angles of hexagon.

Complete the figure by drawing the lines Z.

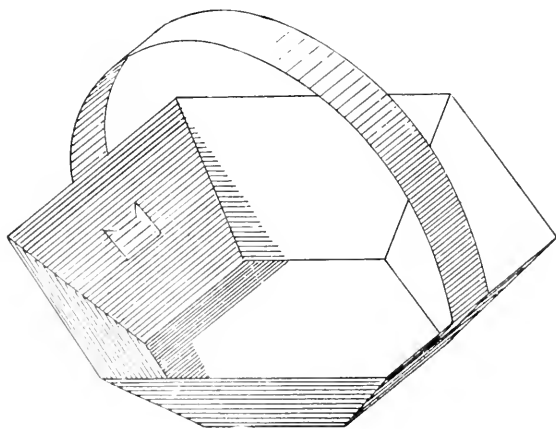
Cut on full lines, score on dashed lines and fold.

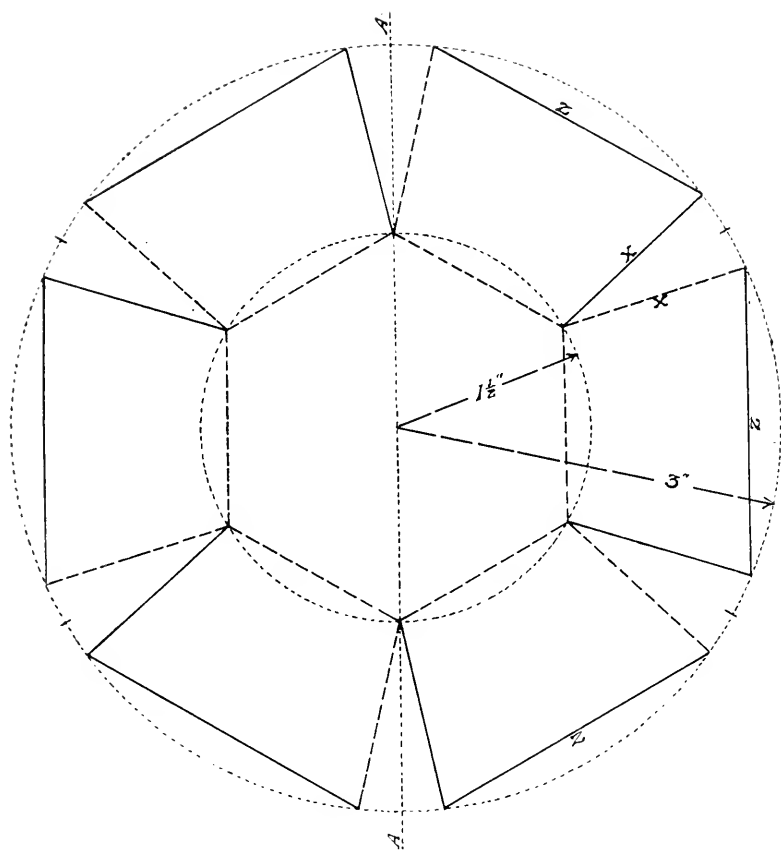
Fasten flaps with paste on inside of basket.

Make the handle $\frac{1}{2}''$ wide and paste it to the inside of basket, or fasten with eyelets.

Material:

Tagboard.





94 Course.

No. 7. Bank.

(Cube.)

Construction:

Draw rectangle A B, 9"x2½", and divide into four equal parts.

Draw the squares C, D. Draw flap lines ½" as shown in drawing.

Cut on full black lines.

Score and fold on dashed lines.

In one square draw and cut the opening X.

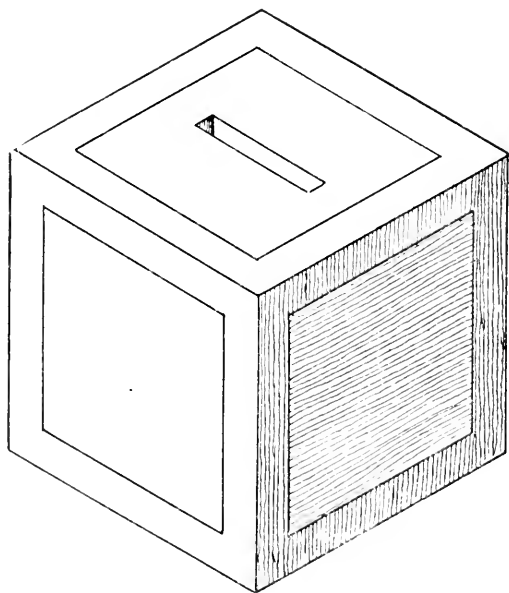
Fasten with paste, placing flaps on inside.

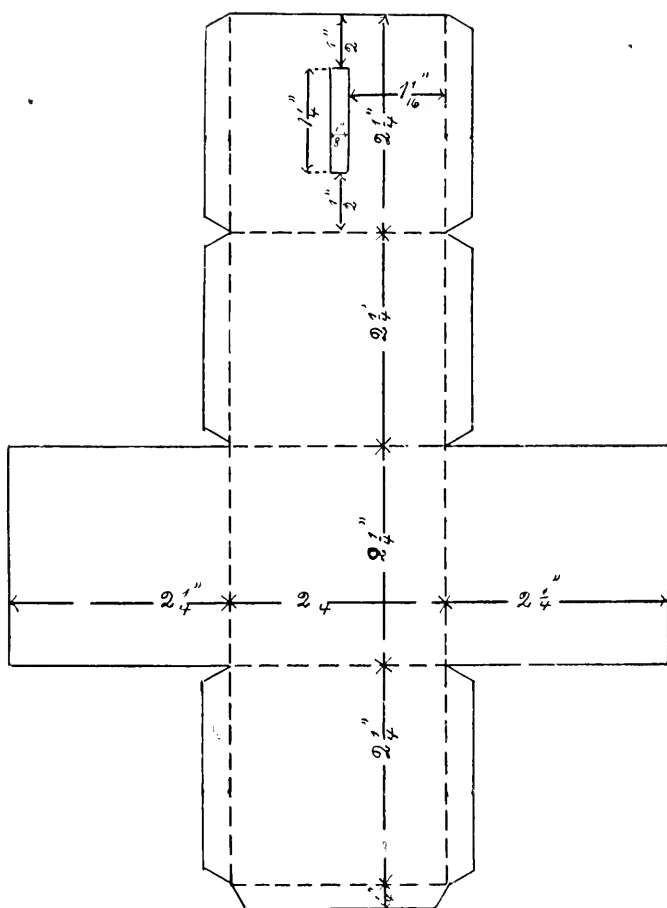
Cut pieces of fancy paper and attach to surface as shown in sketch.

Teach concepts of cube—surface, edges and solid angles.

Materials:

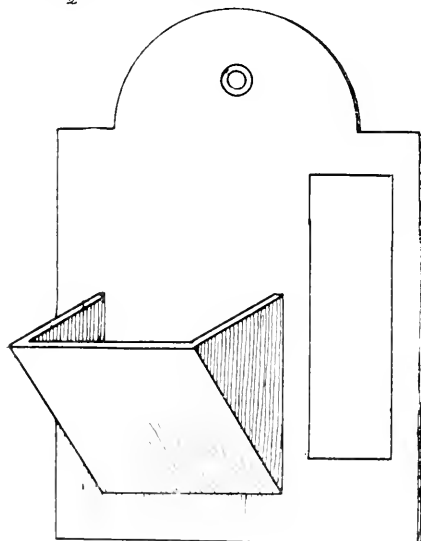
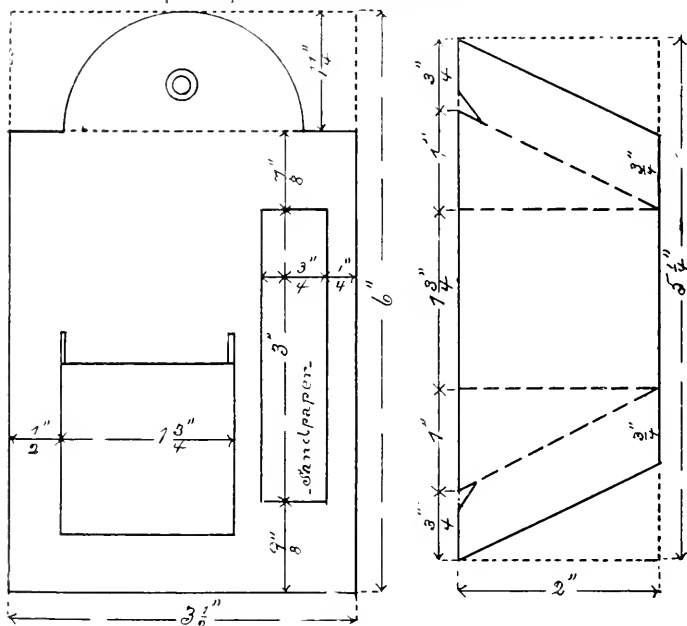
Tagboard and fancy paper.



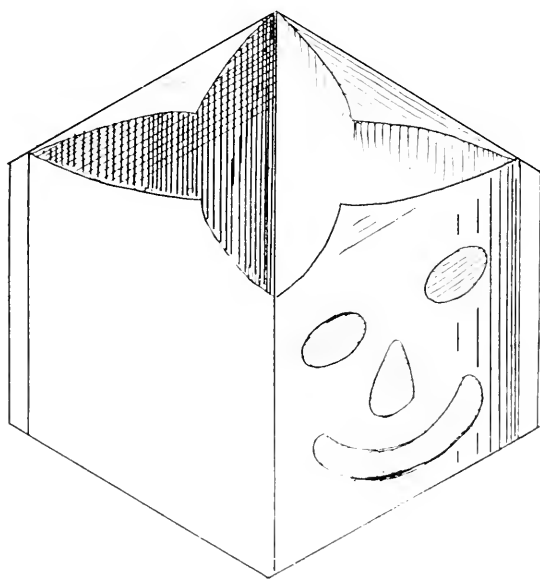
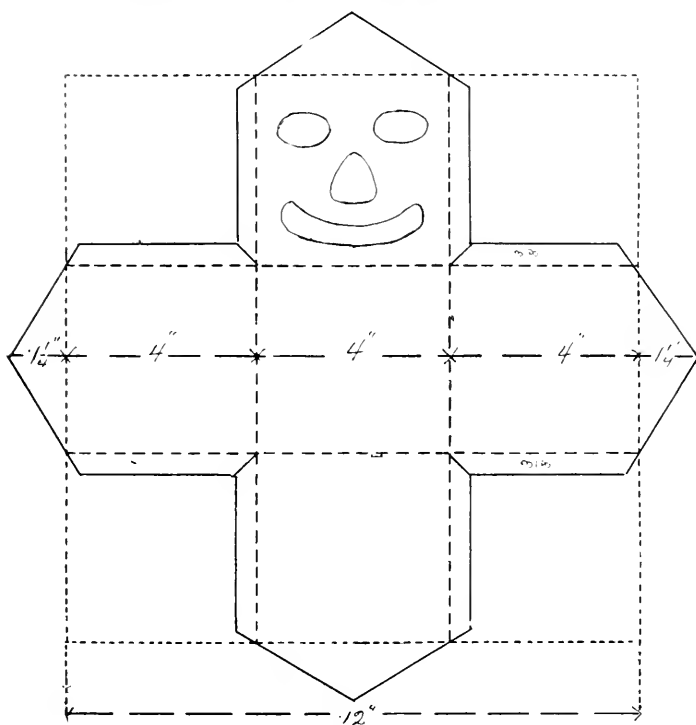


Supplementary. Matchsafe.

Draw and cut figure according to drawing. No paste is used on the model, except to fasten piece of sandpaper on front. The pocket piece is inserted and flaps folded over to one side of back of frontpiece and thus locking themselves, they keep the model together.



Supplementary. Jacko'lantern for Hallowe'en.



Advanced Fourth Grade Work or Fifth Grade Course.

The course herein appended is intended as advanced work for the fourth grade. In rural schools, where grading and classification varies from that of large cities, this course serves as Fifth grade work. The models, some of which were in motive suggested by some of the author's assistants, are logically planned. They are absolutely useful and admit, like the models in preceding courses, of almost infinite modification as to size, decoration, etc. With reference to decoration, it ought to be pointed out that there are various modes, such as water color design, spot design with red and blue ink, using stencil made of paper, gummed paper, passepartout strips, etc. Lastly, most tasteful arrangements of lines drawn by soft and heavy lead pencils may be applied, and children and teachers may choose between these modes.

No. 1. Postal Card Album.

Construction:

Draw and cut piece according to drawing.

Score on score lines.

Fasten pieces of passepartout or strips of gummed paper to hinge the covers.

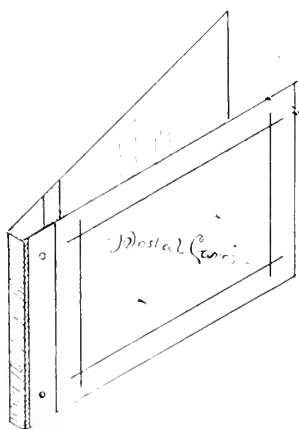
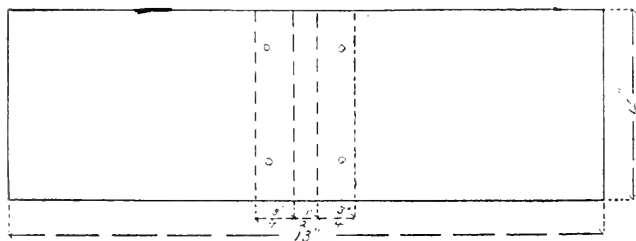
Fasten passepartout or strip of gummed paper to back as shown in sketch.

Press in eyelets in places shown in drawing.

Decorate with lines by soft lead pencil or paper strips as shown in sketch.

Materials:

Mounting board or folderboard.



No. 2. Lampshade.

Construction:

Draw circle $5\frac{1}{2}$ " radius.

Draw concentric circles inside, 5" and $11\frac{1}{2}$ " respectively.

Draw semicircles $1\frac{1}{2}$ " radius on the 5" circle.

Draw sector $7\frac{1}{2}$ ".

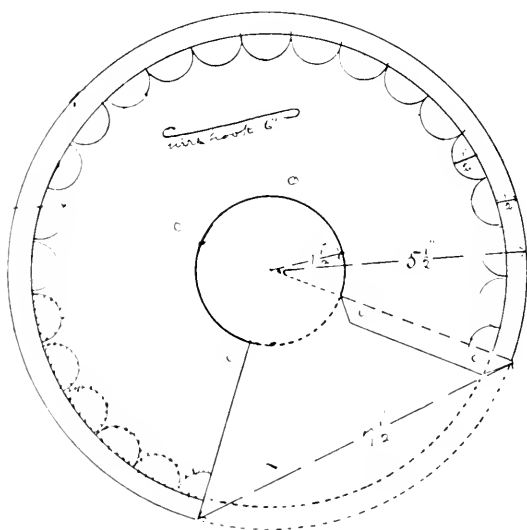
Cut around exterior and interior circles, and cut out sector, leaving $1\frac{1}{2}$ " flap on one side for fastening. Perforate semicircles and also the circle upon which they are drawn, using point of compass.

Fasten together with eyelets.

Use galvanized wire, No. 18, soft, for hooks, bent with round nosed pliers to suspend shade on lamp chimney.

Material:

Gray mounting board or folderboard.



No. 3. Box.

Construction:

Draw piece for frame of box according to drawings.

Score and fold.

Before fastening together cut slits in oblique corners of frame, for bottom of box. In cutting slits bore a hole in each end of slit, using point of compasses: this ensures definite cutting.

Fasten frame with eyelets, paper fastener, zephyr, or raphia.

Measure size of bottom.

Draw and cut it.

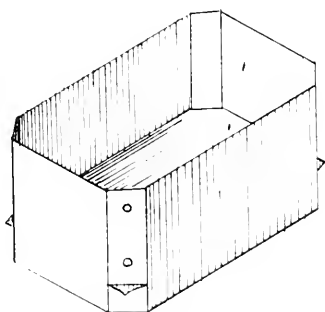
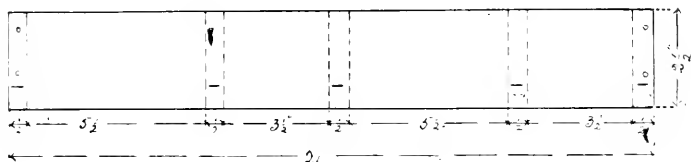
Insert corners of bottom as shown in sketch.

If necessary brace bottom to frame of box by a strip of paper pasted on under side of bottom.

This box may be mounted with silk or tissue paper.

Materials:

Cover paper mounting board or folderboard.



No. 4. Covered Box.

Construction:

Draw unfoldment of box according to drawing.

Score and fold.

Paste flaps on inside of box.

Paste passepartout strips along edges as indicated in sketch.

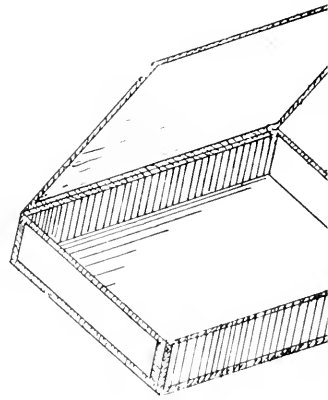
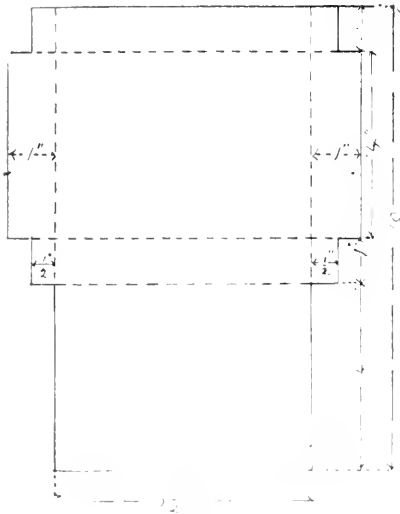
Remember to cut lid of box one-eighth of an inch larger at ends and front, to cover sides perfectly.

Decorate model by using gummed paper, or line up lines with soft heavy lead pencil.

This box may be made of strawboard and covered with fancy paper or leatherette.

Materials:

Mounting board, cover paper or folderboard.



No. 5. Whiskbroom Holder.

Construction:

Draw outline of back piece according to drawing.

Cut out piece.

Draw front piece according to drawing.

Draw curves by freehand.

Cut and score according to drawing.

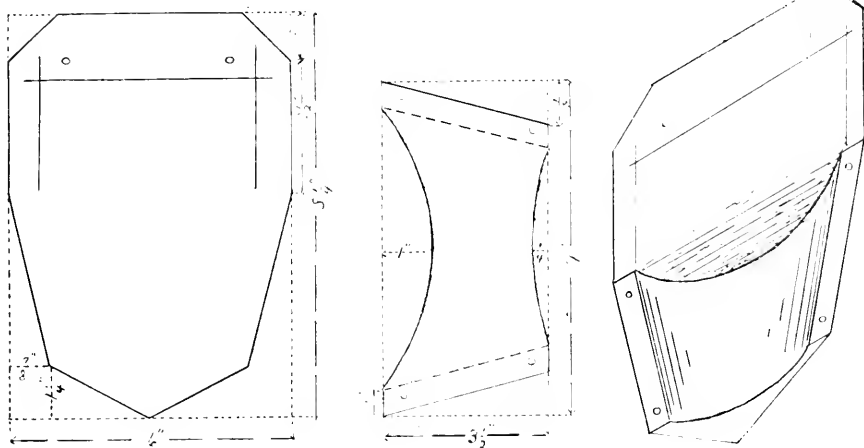
Fasten to back piece by using eyelets or paste.

Press in eyelets in top of back piece to hang model on.

Materials:

Gray mounting board, folderboard or tagboard.

Decorate with gummed paper or with heavy lead pencil lines.



No. 6. Pencil Box.

Construction:

Draw, cut and make inside box first, pasting and finishing it. Then place same on the piece of paper intended for outside case, and mark out the dimensions to fit. This will ensure right fit, so that the inside box will slide easily.

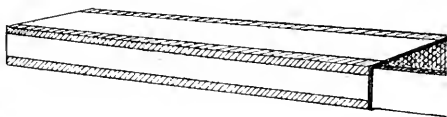
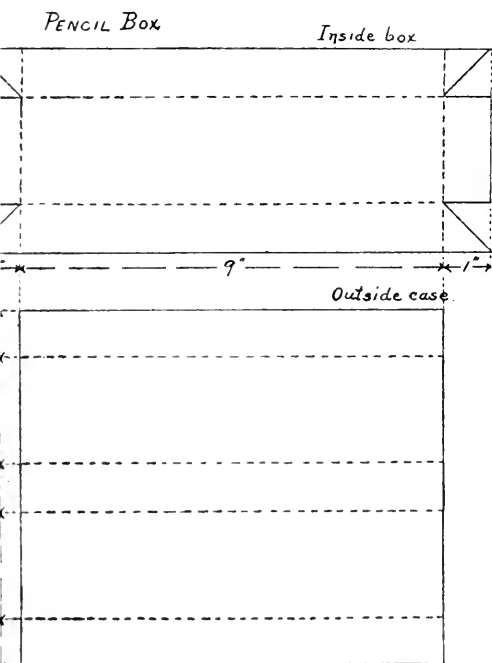
Line edges with passepartout or gummed paper.

Draw and cut strip $\frac{3}{4}$ " wide and 4" long, and fasten same to bottom of inside box, as pulling strap.

Decorate by drawing lines with soft and heavy lead pencil.

Material:

Gray mounting board or folderboard.

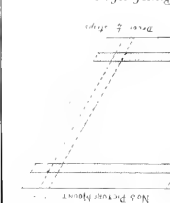
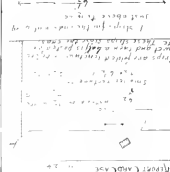
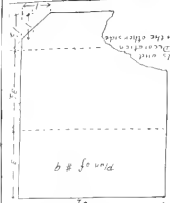
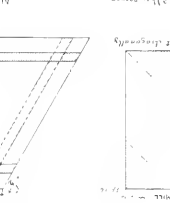
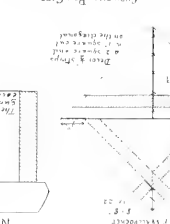
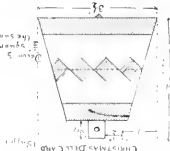
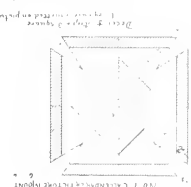
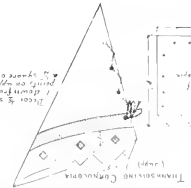
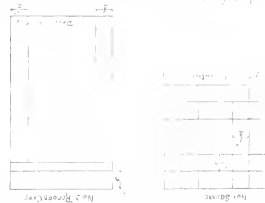
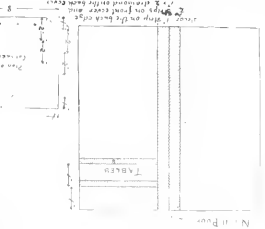


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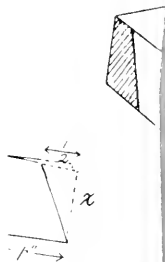
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Plate I. Decorations, B & Curses

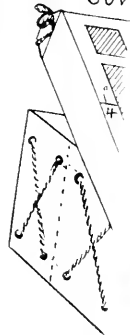


The 1" strips are joined together by means of a 1/2" strip of leather. The 1/2" strip is placed in the center of the 1" strip and the 1/2" strip is placed in the center of the 1" strip.

No 1



No 5 Cov



Plan of #



Dec

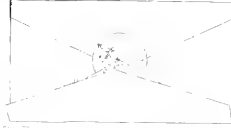


Fig. 1. Envelope (A and B) 100%

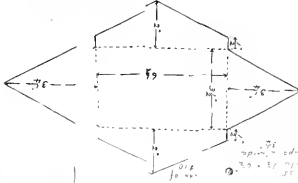
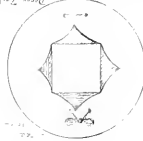
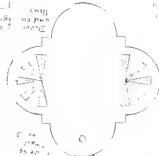


Fig. 2. Envelope (C and D) 100%

Decor. 1. Square the diagonal for the side of roll and 1 strip on under side of lower roll



No. 5. Circular Envelope



No. 7. Circular Envelope



No. 8. Star



No. 9. Round Seal



No. 10. Pen Wiper



Decor. 2. Square the diagonal for the side of roll and 1 strip on under side of lower roll



No. 11. Wall Pocket



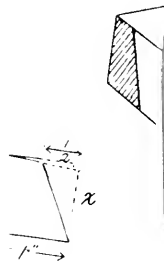
No. 12. Fourfold Holder

Decor. 3. Square the diagonal for the side of roll and 1 strip on under side of lower roll

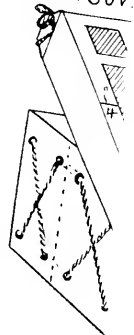
Decor. 4. Square the diagonal for the side of roll and 1 strip on under side of lower roll

Decor. 5. Square the diagonal for the side of roll and 1 strip on under side of lower roll

No 1



No. 5. Cov.

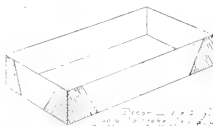


Plan of #



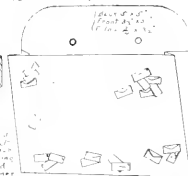
Dec

No 1 Open Box



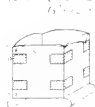
Decor - 1 x 2 pt
- 10 in to make 12 in. at top
then 12 in. at top and then
12 in. at top and then 12 in.
above. Thanks should be held
inside while fastening on corner
pieces

No 2 Letter Pocket



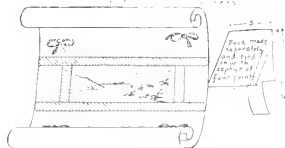
Decor - 1 x 2 pt

No 3 Match Safe

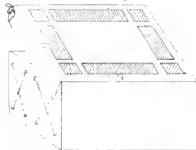


Decor - 1 x 2 pt

No 4 Frame

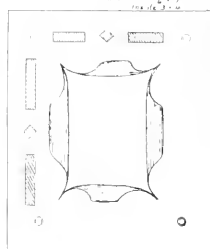


No 5 Covered Box



Decor 3 x 1/2 and
1/2 x 2

No 6 Picture Frame



Decor - 1 x 2 pt squares

1/2 x 1/2 rectangles

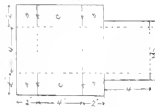
No definite spacing given

No 7 Hanging Basket



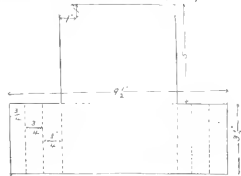
Decor 1/2 x 1/2 and 1/2 x 1/2
circles of 1/2 radius

Plan of #5

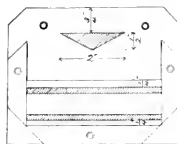


Cut on A
fold inside
of C and then
as shown in
drawing above

Plan of #2

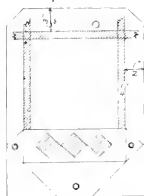


No 1 WALLPOCKET



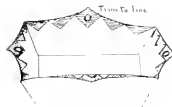
Decor $\frac{1}{2}$ " strips
and a piece $\frac{1}{2} \times 2$ "

No 2 MATCHSAFE



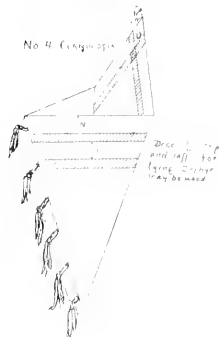
Decor $\frac{1}{2}$ " strips
and $\frac{1}{2}$ " squares

No 3 TRAY



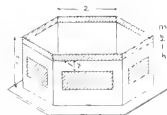
Decor $\frac{1}{2}$ " squares at point,
and $\frac{1}{2}$ " triangles

No 4 CRYSTAL



Decor $\frac{1}{2}$ " strips
and raff for
lying center
ray be made

No 5 HEXAGONAL BOX



make sides
 $\frac{1}{2}$ " instead of
1" long by $\frac{1}{2}$ "
high

Decor - upper edge $\frac{1}{2}$ " folded
so as to be $\frac{1}{2}$ " then stick on both sides
making a covered edge. Also $\frac{1}{2} \times 1\frac{1}{2}$ panels

No 6 BASKET



Cut out the
edge in curved
line instead of straight

Decor $\frac{1}{2}$ " \times $1\frac{1}{2}$ " at each end of handle
and $\frac{1}{2}$ " strip placed diagonally on
middle of handle

No 7 BASKET



Decor 2 squares

No 8 BASKET



Decor $\frac{1}{2}$ " square
and the wire

The author is indebted to merchants of the city for samples of paper herein presented. There are, of course, many other cheaper and more expensive materials that may be used. The aim of these courses is to make the work consistently inexpensive, constructive, decorative and simple, and truthful and generally applicable. Following is a description of samples presented below:

First Sample:

Gummed or ungummed paper for decoration.

Second Sample:

Tagboard (folderboard), 22"x28", 150 lb.

Third Sample (for water color work):

Kenmore, Primrose 20"x25", 60 lb.

Fourth Sample:

Royal Melton cover 20"x25", 70 lb.

Fifth Sample:

Highlight, cover, 20"x25", 65 lb.

Sixth Sample:

Bristol board (folding), 22"x28", 120 lb.

All the above papers, except Kenmore, can be procured in similar and other assorted colors in small quantities, 25 to 30 cents per dozen. Large orders at lower prices.





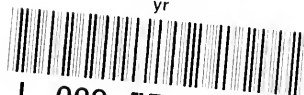


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